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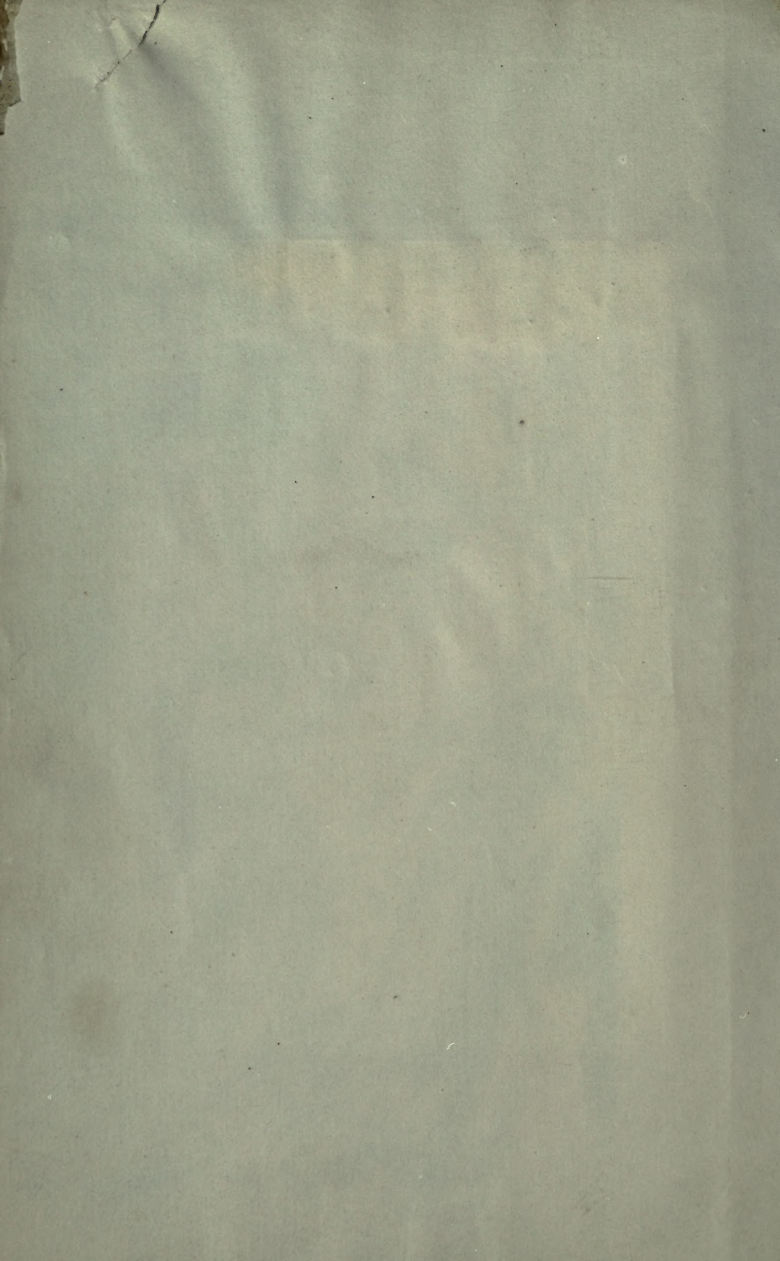
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THE
ILLUSTRATED HANDBOOK
OF
THE BRITISH PLANTS.

BY
ALEXANDER IRVINE, F.B.S.,

EDITOR OF THE "PHYTOLOGIST" (A JOURNAL OF BOTANY); AND AUTHOR OF
"A BOTANICAL TOUR IN THE HIGHLANDS OF PERTHSHIRE;" ETC. ETC.



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TO

ROBERT BROWN. ESQ., LL.D.

The New botanists' guide
70.6.37 Watson H.C. - 1885-7.

7000	Babington. C. C.	12	Lond
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	4th Ed.		

PREFACE.

THE student of our native plants will, in the following pages, be supplied with every facility for the successful accomplishment of his object. The introductory matter, though not intended for an introduction to botany, is a sufficient introduction to the knowledge of the British plants. The whole has been drawn up or compiled with the intention of meeting the necessities of those who have not a botanical library on their shelves, while it will be equally available to the learned and wealthy, in the midst of their ample resources and appliances, in sparing them the trouble of consulting heavier and more voluminous works. The descriptive portion has been relieved as much as possible of all extraneous and irrelevant matter; and the explanatory Index has been found a convenient receptacle for much that would have been an incumbrance to the text. The Author's earnest desire was to make the entire work a "*multum in parvo*."

In reference to nomenclature, readers and students are requested to bear in mind that the names, specific and generic, in the "London Catalogue of British Plants," as it is usually called, have been generally adopted. The Editor wishes to state, most explicitly and decidedly, that he has made no alteration whatever; he has introduced no new plants, and consequently had no occasion to invent new names. The names given in the "London Catalogue," abbreviated always into L. C., are assumed to be the *right* names, or the commonly received names by which the plants are known or designated by British botanists. There are some few instances where the name as it stands in the "London Catalogue" has not been taken; but in all these exceptional cases the "London Catalogue" name has been printed in italics. The nomenclature of this work is therefore that of the "London Catalogue," which has been generally followed, and not used as a ground-work merely. The number prefixed to the name, as all who use this Catalogue are aware, is the number of the plant as it originally was placed in the herbarium of the Botanical Society of London. This herbarium, though unhappily no longer in the Society's possession, is still extant, and may be consulted on proper application being made to its proprietor, *teste* his advertisements in the "*Phytologist*."

The specific characters of all the British species here published are therefore descriptive of the specimens in the Society's herbarium, or of examples which are represented by the names and numbers of their Catalogue. Hence this work may be considered a *catalogue*.

raisonnée of the British plants as exemplified by the herbarium to which the "London Catalogue" is a complete index.

In the case of all common plants, and of many rare plants also, the descriptions were compiled from fresh (recent) examples collected by the describer himself, or sent to him by several obliging friendly correspondents, whose names he would have much pleasure in here recording if he had permission. To each and all of these he here begs to offer his grateful acknowledgments of his obligations to them for their kindness. During the composition of the work, herborizing journeys were undertaken into many parts of England, Wales, and Scotland, and the fruits of these expeditions are interspersed through the following pages. When fresh specimens were unattainable, recourse was had to the Author's herbarium, to the Society's herbarium, or to the herbaria of his friends. To these he is under considerable obligations, which are hereby recorded, and thanks duly tendered. In the case of only a few very rare or doubtful plants, the works of other botanists have been consulted; and in these cases the best figures procurable were studied, and the plainest and concisest descriptions compiled from these eminent authorities. The works to which he is chiefly indebted are given in a list, which might have been very much extended if every work consulted or quoted had been therein stated; but it was thought that making a long list of authorities would have savoured more of ostentation than of careful comparison. In general he has derived more information from the French than from the German botanists; and without undervaluing Koch, whose reputation in England is deservedly high, the pages of Grenier and Godron, of Cosson and Germain, have been more serviceable than those of Koch and Reichenbach.

From the above statement, viz., that the Author relied on specimens whenever he could obtain them, it should not be inferred that he neglected to avail himself of the works of those celebrated authors who have preceded him in the same field of research. This would be a misapprehension which he wishes to remove as being in direct contrast with his invariable practice. The specimens, whether recent or herbarium, have generally been compared with the best descriptions within reach. This has been always done in doubtful cases. For this purpose he has employed the generally full and accurate descriptions in the "English Flora" of the celebrated Sir J. E. Smith, the *facile princeps* of British botanists, and in some instances the very elaborate and comprehensive specific characters drawn up by the late amiable Dr. Bromfield for his intended "Flora of Hampshire," which appeared in the "Phytologist," and more recently in the "Flora Vectensis." The "Flora of Shropshire," by the Rev. W. A. Leighton, has also been consulted occasionally, and with advantage. These two excellent works being local in their extent, were of course only partially available. The same remark is applicable to the valuable "Flore des Environs de Paris," to whom the Compiler of this work is under special obligations. The earlier parts of the "Flore de France," by Grenier and Godron, helped the

Author in determining the Wandsworth species, and the species generally antecedent to the order *Leguminiferae*. Moris's "*Flora Sardoia*," aided him in determining the *Medicagos*, *Melilots*, &c.

The *Rubi* were described from the Rev. A. Bloxam's fasciculus of *Rubi*, in conformity generally with Mr. Babington's views. Mr. Backhouse's "Monograph" was followed in working out and describing the *Hieracia*; and the Rev. Mr. Leeffe in the order *Salicaceae*. This is not the place for justifying in some cases a departure from the course adopted by these eminent botanists. The Author here acknowledges, with due respect, the help he has derived from their labours.

In arranging the orders, Cosson and Germain have been followed, with a difference, viz., that their first order is the last in this work on our native plants. In beginning with the *Cryptogamous* orders, the high authority of Jussieu and of Dr. Lindley has been followed. It would be more impertinent than respectful to offer an apology for this procedure. In arranging the genera, more regard has been paid to external appearance, to obvious and prominent characters, than to microscopical minutiae. The species are arranged by the same principle, only with this difference, that common species have been selected as occupants of the first rank, in order that the tyro might not have far to fetch an example of a species, nor long to wait for the means of studying the genus.

In the descriptions themselves, technicalities, and terminology, care was taken to describe with as much conciseness as was consistent with clearness, and the employment of unnecessary scientific words and phrases has been sedulously avoided. There is no affectation of a popular style of description, which in a work of science is both absurd and disgustingly offensive, but there is a not-inconsiderable attempt made to simplify in some degree the phraseology and to smoothen the asperities of modern scientific description.

The Publishers and the Author are here desirous of expressing their obligations to Mr. H. C. Watson, for his liberal permission to quote the Area, the County-census, the Altitude, Latitude, and Temperature from the "*Cybele Britannica*." On this important feature of the present work it is needful to make a remark, in deference to the opinion expressed by some friends, who maintain that the grand idea of the learned author of the "*Cybele*" has not been carried out in this descriptive enumeration of the British plants. It has been asserted, and no doubt truly, that the aim of the "*Cybele*" is to specify with as much exactness as possible the centres of the species, or those points whence they radiate, or from which they extend in all directions, or to establish the types of distribution. This may be so. But the intention of the Author of the present work was, and is, very different from that above stated. His object was to supply the student of the British Flora with the best information attainable on the distribution of species. Accordingly, he has quoted from the "*Cybele*" the extremes of latitude between which the plant may be expected to occur in the British Isles, or the area lying between these extreme limits; also the extremes of altitude within

which the plant may be expected, between the coast line or lower limit and the highest altitude where the plant is known to grow. The coast-line, marked 0, and the greatest alpine elevations are the extreme limits of vertical range. The temperature is also given in the two extremes, viz., the greatest annual average of the South of England and the greatest annual average of the alpine heights, or of the northern parts of the island. The object was to supply the student with some authoritative data to enable him to decide for himself the probability of finding certain plants in certain latitudes. The provincial and comital, or county, areas are positive facts; and the latitude, together with the altitude, will help him to determine in what provinces the plant is present, and in what provinces and counties it is absent. For example, if he observes the vertical range of any plant to exceed 400 yards, he may conclude that it is not a plant of any of the southern or eastern portions of the whole eighteen botanical provinces into which Great Britain is divided. If its altitude exceeds a 1000 yards, it may be inferred that it is a plant of North Wales or of Scotland.

The use of the terms *Arctic*, *Boreal*, *Germanic*, *Atlantic* types, &c., was declined as inexpedient, and as more likely to puzzle and perplex the junior student than to enlighten him. This work is not meant to embrace the objects for which the "Cybele" was composed. It is an introduction to the knowledge of British plants, not the history of their immigration, colonization, and subsequent naturalization and complete establishment in this island. But another important consideration remains to be urged in justification of the procedure adopted; and this should be duly weighed by all who voluntarily undertake the office of public teachers, whether from the press or platform, viz., that it is not prudent to originate more questions than they can satisfactorily answer. It is a truism that questions are more easily asked than answered; and as the proverb teaches us, that "a fool may ask a question which seven wise men cannot answer," it was judged desirable, in an elementary work, to avoid all such terms as might induce doubts or questionings in the minds of the readers.

Moreover, a natural historian has to deal with things, and not opinions. The Author professes to state facts, and he has not yet attained to a complete conviction that the classification of the British, or of any species, into *natives*, *denizens*, or *colonists*, *naturalized* and *semi-naturalized*, is a fact, or is in all cases founded on facts; and therefore he leaves this matter to be settled, or modified, or adjusted by those learned authorities who have made these branches of the science their particular or special study.

It is humbly urged, that these and similar questions are *beyond the border* of an Author who professes to be merely a relater of facts observed by himself, or a narrator of the facts observed by others; and, in an elementary treatise, the above-mentioned subjects are better omitted than discussed. If it be urged that classification itself is not a reality, yet it is so convenient that we must employ it, the truth of this is admitted. Classifications are, even the best of them, but con-

ventional accommodations, but are as necessary to the student as the juxtaposition of letters in language, and the use of figures and signs in arithmetic and mathematics. All botanists admit this as both necessary and expedient. But how many will admit the necessity or expediency of strictly defining what plants are originally British, and what are importations? Or who will, at this late period of the world's and vegetation's history, draw the exact distinction between the aborigines, the native plants, and the exotics or foreigners? These remarks are not made with the intention of undervaluing the labours of those who attempt to ascertain what are and what are not native species, but solely for the sake of justifying the course invariably followed in the compilation of this work. That there are native plants nobody doubts; and that there are naturalized plants, both history and our own experience and observation testify. But many of the plants now commonly distributed, like many of the species not uncommonly received in the present age as genuine, must be put into the doubtful categories, or be classed with the *questiones vexatæ*, the *betes noirs*, the *opprobria* of modern science. Science, however, ought sturdily to reject them, and insist upon her prerogative of dealing with facts unencumbered with speculative opinions.

Beginners seek in books something positive and practical, not scientific mysteries. A plant, whether alien or native, is a plant to them, as Peter Bell's Primrose was to him; and it is to be hoped that it will be something more. They may not at first recognize it as a rare plant; but they will soon learn whether it be a corn-field or a wayside, or a moorland or a woodland plant. They need not puzzle themselves with the history of ninety-nine in a hundred of the British plants, for this is concealed in the darkness, mist, and haze of past ages. If they discover, or are told, that certain plants are aliens in British soil, though they may have grown here for generations, in most cases they will fail in determining if the *alien* has been so for a hundred years or for a thousand. They mostly want to know the name of their plant, and its place in some systematic classification. Few of them would thank the author for proving its claim to be ranked among the aliens, the colonists, the denizens, or the natives of Britain. A taste for these questions is the growth of time and experience. The aboriginal locality, the facts of rarity, unfrequency, and commonness are held but in slender estimation by those who are contented if they know the names, the characters and qualities of their acquisition. They will want to know more as their minds enlarge with the enlargement of their knowledge of the subject.

But there are in all countries, less or more cultivated, certain plants, or races or varieties of plants, neither native nor naturalized either in this or in any other known country. There are hundreds of plants cultivated, both for use and ornament, which have never been found wild, have no native country, but are, in the proper sense of the term, cosmopolitan. Of this kind are many weeds, as well as useful herbaceous and arborescent species. These accompany man in all his wanderings; and where he fixes his abode, there they establish

their station. Of these matters more will be found in the Introduction.

In the present work few localities for rare plants are inserted. It is not always stated that the plant is a rare one; although such may be the case. The quotation from the "Cybele" is in most cases a statement of the frequency or rarity of the species;—universal distribution is an evidence of frequency and multitude—both abundant in stations and stations in abundance. When stations follow rare plants without any authority, the Author is responsible; and he enters them not as the sole stations where a rare plant or rare plants grow, but as places where he has seen them, and without the slightest intention of conveying a hint that they are limited to these places. It is by each one recording his own observations that the area, or range, or localities of plants can be satisfactorily determined. As a general rule, all stations for rare plants are omitted from the present work, excepting for the very *rarisissimæ*, such as *Cyperus fuscus*, *Sonchus palustris*, and the like. The book is not intended to be a record of localities, but a record of plants.

An apology may be expected for what may be deemed the intrusion of so many foreigners into a descriptive catalogue of British plants. To meet this anticipated disapprobation of the course adopted, the following is respectfully tendered. These plants were all, with the exception of *four* duly noticed in the Appendix, collected by the Author in the place or places specified at the close of their description or notice. As they grew, or still grow, where they were collected, they may grow in other parts of the British Isles; that some of them do so is a fact well established by competent observers. The Author does not admit them as naturalized plants; but he strenuously affirms their spontaneous growth. As young botanists may occasionally meet with such stragglers as well as veterans, it is thought better, for the sake of the former, that they should be entered and described. If it be objected that such a course is calculated to disturb the existing classification of natives, denizens, colonists, aliens, &c., it may be replied that nature and the necessities of humanity or commercial intercourse, the progress of cultivation, amelioration of climatic or atmospheric phenomena, &c., &c., have already disturbed these laws of plant-distribution, if they be laws; and there is no little probability that some of these stray plants will, like *Mimulus luteus* and *Impatiens fulva*, ultimately be as well established as many of our annual Agrarials, whose nativity is never questioned.

The number of these stragglers, or waifs, as they are sometimes derisively called, might have been increased three or fourfold, if their names could have been determined in time to be printed even in the Appendix. They are all from the vale of Thames, with the exception of two or three of the Yorkshire *parvenues*. They have been seen in other places, as at Southampton, the Isle of Wight, and Manchester; but few are recorded here which have not been seen near London, in addition to the other places of which they have taken possession. A great many reputed British plants have been observed among these

foreigners; from which it may be reasonably inferred, that these so-called British species, or some of them at least, are no more genuine denizens of the British Isles than the strangers are. Like the pigeon that was caught with the crow, and was served with the same sauce as that predaceous bird, these *soi-disant* British plants, being caught in bad company, are suspected, or of ill habit and repute, as men say in Scotland.

The plants of undoubted exotic origin, now introduced for the first time to the notice of British botanists, are not ballast plants; or, in other words, they were not imported into this country in ballast, but generally in more valuable cargoes; neither are they "outcasts from gardens" nor "escapes from cultivation." These stereotyped phrases, in their case, must be discontinued as utterly inapplicable to them. They were never objects of garden culture, nor of any cultivation whatever. The causes which produced them on British ground are still in operation, and have been in operation from that early period, far beyond the mythic ages, when the first daring mortal, the adventurous mariner, *cui robur et æs triplex circa pectus erat*, who first launched his tiny skiff on the truculent waves of the English Channel, and passed over into the fair Isle of Britain. He did not come unaccompanied with forms of life, both vegetable and animal. Plants were interchanged by the intercourse of nations. These operative causes were probably small at that early period, but they have been increasingly productive of more important changes as commercial enterprise was developed, and as the intercourse of the human race, in all parts of the earth, was stimulated by the necessities incident to a highly civilized condition of mankind. We cannot be inattentive to these facts; it is sheer pedantry to ignore them. We are not always able to tell with certainty what is the native country of the strangers, but we can tell that it is not Great Britain. They may come from the East, from the regions of the Don Cossacks, from the Valley of the Nile, the Gulf of St. Lawrence, the Brazils, or the Basin of the Rhone. Sometimes we can guess at their fatherland; but we certainly know that they find here a climate and a soil suitable for their development. Some of them are able to continue the race by producing fruit; others may become acclimatized.

The only necessary condition appears to be that the soil remains pulverized. If they obtain this, many of them go on reproducing themselves, and will in time be admitted into the ranks of naturalized species, and when once they get into the stirrup they are certain of reaching the saddle. The steps upwards through alien, naturalized, colonist, denizen, up to native, are slow but sure. Time only is wanted.

It may be proper to meet another probable objection. It will, no doubt, be observed that in the illustrative examples all the cuts do not represent British species. A few of them are figures of foreign plants, which illustrate both order and genus, but not in every case a British species. In deference to our patrons, the public, it is to be observed, that if every order had been illustrated by an original drawing, and a block of the same had been engraved and cast, the expense of the work, great as it has been, would have been

greater, and, commercially speaking, the book could not have been produced so as to justify the Proprietors in issuing it at the moderately remunerative price charged. Some of the casts were the property of the Publishers. Several others were capable of being used by making some alterations on them or of additions to them. A considerable number is original, or portions selected from Nees von Esenbeck's excellent "Genera Germanica." Some of the latter are not quite so expressive or ornamental as could have been wished, but they are all faithful, if not always very artistic, representations of the objects they are intended to illustrate.

The Author has been reminded by a kind friend that the derivation of the generic names at least would have been a useful addition. This had already been determined; but it was thought inconvenient to overload the text, which is already very copious, with etymological facts or deductions. This has been reserved for the Index, which, like the book itself, is a *résumé* of all that is already known, or which the Compiler could learn by much laborious research about the names of the British plants, whether classical, scientific, or popular.

The advantage has been twofold; for, first, the text has been freed from everything extraneous, and, secondly, the information conveyed in the Index is more full and systematic than if given in the purely descriptive part. The names of species, genera, and orders often, nay generally, convey much knowledge of the character, or habit, or locality, or origin, or history of the species, &c., which would be altogether unperceived by the unlearned without an ample explanation, such an exposition as would have been inadmissible in the descriptive part. An explanation of technical terms was necessary, and it was thought best to throw the whole together into one common repository. *Experimentum factum est*. The plan has been fairly tried. The Index is an experiment—the whole work is an experiment—to ascertain how much botanical, scientific, and historical information could be condensed into the smallest possible space, and which might be sold at the smallest possible price. This is, on all hands, admitted to be a step in the right direction, and for which thanks from several quarters have been already offered.

In this place it is requisite to allude to another topic which is not quite so satisfactory to the Author as the foregoing. Yet unpleasant though it be, it is both candid and respectful to do spontaneously (*proprio motu*) what zealous lynx-eyed persons might do for him. He is well aware that the execution of the work is not exactly what he wished it to be. It is not immaculate. He has no reason to repent of the plan which was long and anxiously considered. System, uniformity, and consistency were all duly provided for; but unhappily many delays intervened, and all the well-formed resolutions were not realized. During the progress of the work (it was begun in 1850), and while it was in abeyance, the author's views were modified in some instances; also many facts, the results of the observations of seven years, had to be incorporated. The "Cybele" was not completed till after some considerable progress had been made. The

number of the "London Catalogue" was an after-thought. Science was advancing while the MS. was stationary, and many omissions had to be supplied when the printing commenced anew about six or seven months ago. Hence the Appendix fills more pages than might be wished, as the printing proceeded faster than the determination of the plants. The literal or typographical blemishes are, it must be owned, rather numerous, and the Author for these humbly solicits the indulgence of students. He has corrected all that he has observed, and will esteem it a favour to have his attention directed to such as are still undetected, in order that they also may be expunged.

In writing the substantive specific names of plants there is considerable diversity in the practice of authors. It would be a help to uniformity if it were a rule that every substantive specific name should be written with a capital initial. A system was indeed devised, but in the course of procedure it proved inadequate. All adjective specific names, whether derived from proper or appellative or common substantives, have been written with small initials. This is believed to be consistent with the generally adopted modern practice. In the case of proper names of persons, or even of known common plants, the capital has been employed, as in the examples *Lepidium Smithii* and *Carpinus Betulus*. The following are examples of the diversity of practice above alluded to :—*Dipsacus Fullonum* and *D. fullonum*; *Orobanche hederæ* and *O. Picridis* (L. C.); *Orobanche rapum* and *Convolvulus Sepium*; *Gymnadenia conopsea* and *G. Conopsea*; *Neottia Nidus-Avis*, or *N. nidus-avis* or *N. Nidus-avis*; *Hydrocharis Morsus-ranæ* or *H. morsus-ranæ*. In most of these cases, as a rule, the small letters have been preferred, except when the specific name was the name of a well-known plant or of a person, and then a capital has been used. Where it is not so it is a mistake, and, like the examples of incorrect spelling, is the result of an over-hasty inspection of the proof-sheets. This the Author sincerely regrets, and bespeaks in time the indulgence of his readers. He further engages that, if his work should ever be reprinted, and he hopes it will, he will take care to enter all the *addenda* in their proper place, and cancel all the *corrigenda*. He has the satisfaction of hearing that the separate portions of the book have been appreciated, and though he is not about to blow a blast on his own trumpet, nor even to reverberate the friendly *touts* that have been blown to encourage him to persevere in the good work, yet he hopes that it is no evidence of very great presumption to tell his friends and the public that if they give him another opportunity his work will "amend more than sour ale in summer."

This rather lengthy explanatory statement being now finished, the writer begs the indulgence of the reader while he further states, that he takes leave of the subject with extreme reluctance. The continuous labour has been a continual cure for the ills of idleness, a remedy for dulness, lethargy, and "spirits low." When freezing cares and lengthening years had made rest more pleasant than locomotion, this employment supplied a motive for mental activity,

and, in addition to this, it gave an impetus to the physical part of humanity—to the clay tenement now the dwelling of mortals—an object for leaving the fireside or the study, very needful for the preservation of health and cheerfulness. Nothing but this or some kindred pursuit could have had the effect of counteracting that indolence so natural to human nature, that indulgence of the *dolce far niente* which is so seductive. Labour itself is a blessing; but it is a double blessing when it can be expended on objects worth the time and energy of the labourer. The labour bestowed on this work has, in the strictest sense, been a labour of love. Plants themselves, for their own sakes, are lovely—the fairest among the fair things created by God. To all but the incurably stupid, they afford some of the most innocent and attractive pleasures which are to be enjoyed in sublunary things. They are few indeed who have only a Peter-Bell pleasure in flowers. They are objects of profound admiration to those who study them in connection with that beautiful system of which they form the loveliest portion—to those who thoroughly apprehend their use in the economy of nature, their subservience to the pleasure of rational minds, and their absolute necessity to the animated sentient creation.

Before taking leave of his subject and of his book, both of which he loves—even the latter in spite of all its imperfections—and before bidding adieu to the public—the botanical, small, but select, part of the reading public, or that still smaller portion of it which will condescend to notice this work—the Author wishes that those who use it may have as much advantage and contentment in comparing the objects about which it is written with the descriptions therein contained, as he has had enjoyment in its preparation. He is sure, if this desirable result is attained, that they will not regret the money expended on its purchase, nor the time and pains spent in its diligent and careful study.

BOTANICAL WORKS QUOTED OR REFERRED TO.

"The London Catalogue of British Plants," 3rd, 4th, and 5th editions. London, 1850—1857.

"Cybele Britannica," 3 vols. 8vo. London, 1847—1851.

Smith, Sir J. E., "The English Flora," 4 vols. 8vo. 1824—1828.

Hooker and Arnott, "British Flora," 6th and 7th edition. 1850—1855.

C. C. Babington, "Manual of British Botany," 2nd, 3rd, and 4th editions. London, 1846—1856.

"Flore des Environs de Paris," par Cosson et Germain, 2 vols. Paris, 1845.

"Flore de France," par Grenier et Godron. 3 vols. 8vo. Paris, 1848—1856.

"English Botany," by Smith and Sowerby, 2nd edition, 12 vols. 8vo. London, 1830, &c.

The works of Ray, Withering, Hudson, Hull, &c., are little more than incidentally noticed.

The valuable local Floras of the Rev. W. A. Leighton and of Dr. Bromfield have been often consulted, and are occasionally quoted.

Several of the works described in the List of Authorities and Abbreviations have afforded valuable aid, which is hereby gratefully acknowledged

ABBREVIATIONS EXPLAINED,

WITH

AUTHORITIES FOR ORDINAL, GENERIC, AND SPECIFIC NAMES.

E. B., "English Botany." Smith and Sowerby. 36 vols. 8vo, Lond. 1790.
2nd. edition, 12 vols., Lond. 1830.

L. C., "London Catalogue of the British Plants," 1st, 2nd, 3rd, 4th, and 5th editions, Lond. 1836—1857.

A., Area, or number of botanical provinces into which the island of Great Britain is divided. A. 12 signifies that the plant is found in twelve of the eighteen provinces.

C., Counties. C. 50 means that the plant is found in fifty counties.

LAT. is latitude. Lat. 50°—61° means that the species is found between the parallels of fifty and sixty-one degrees north latitude.

ALT. means vertical range, or altitude of the plant. Alt. 0—200 yards signifies that it will be found from 0 the coast line to 200 yards vertical elevation.

T. or TEM., Temperature. T. 51°—45° shows that the plant grows where the temperature is between 51° and 45°, or it has a range of temperature equal to five degrees.

SIX-TWELVE, or ONE-FOUR-FIVE, means that the number of organs or their dimensions vary from six to twelve or from one to four or five.

? When this mark follows a specific name, it implies a doubt if the plant described be that usually known under that name. When ? follows a description of any particular organ or part of a plant, it conveys a doubt if that be the character of the majority of examples, or only a partial or individual character. It intimates a doubt that the character may be individual and not specific.

VAR. means variety.

AG., Agardh, J. G. "Systema Algarum."

AIT., Aiton, Wm., author of "Hortus Kewensis, 1789—1813.

ALL., ALLIONI. "Flora Pedemontana," 3 vols. folio, 1785, &c.

AND., Anderson, N. J. "Cyperaceæ Scandinaviæ," 8vo, Holmiæ, 1849.

ANDRZ., Andrzejowski, A. Crackia. "Genre déterminé et décrit Krzemieniec," 4to, 1818.

ARD., Arduini, P. "Animadversionum Bot." Specimen, 4to. Patavii, 1749.

BAR., Babington, C. C. "Manual of British Botany," 12mo, Lond. 1846—1856.

BACK., Backhouse, J. "Monograph of the British *Hieracia*," 8vo, York, 1856.

BALB., Balbis, J. B. "Flora Ticinensis," 4to, 1816—1821.

BART., Bartling, F. G. "Ordines Naturales Plantarum," 8vo, Goettingæ, 1830.

BAUM., Baumgarten, J. C. G. "Enumeratio Stirpium Transyl." 3 vols. 8vo, Vindobonæ, 1816.

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BERNH., Bernhards, J. J. "Index Seminum Horti Erfurtensis."

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BESS., Besser, V. S. "Enumeratio Plantarum in Volhynia," Podolia, &c., 1822.

BIEB., Bieberstein, Marschall de. "Flora Taurico-Caucasica," 8vo, 1808.

BIG., Bigelow, J. "Flora Bostoniensis," 8vo, Boston, 1840.

BOREAU, A. "Fl. du Centre de la France," 8vo, Paris, 1840.

BRACK., Brackenridge, an American Naturalist, who first identified or described *Lastrea æmula*.

BR., Braun, A., an author of papers in "Flora," vii., xiii., xvii.

BROM., Bromfield, W. A., author of "Flora Vectensis," 1856.

BROWN, R. "Prodromus Fl. N. Hollandiæ," &c., 8vo, Lond. 1810.

CAMB., Cambessedes, J. "Enum. Plant. quas in insulis Balearibus Coll. J. C.," 4to, Paris, 1827.

CASS., Cassini, A. H. G. "Opusculæ Phytologiques," 8vo, Paris, 1826—1834.

CHAM., Chamisso, A. de, a writer in "Linnæa," a botanical periodical.

COLEMAN, the Rev. W. H., M.A., discoverer of *Eranthe fluvialis*.

COSS. ET GER., Cosson and Germain. "Flore des Environs de Paris," 2 vols., with Atlas, 12mo, Paris, 1845.

COULT., Coulter, T. "Memoire sur la Dipsacées," 4to, Genève, 823.

CR., Crantz, H. J. N. "Stirpium Austriac.," pars. i., ii., Viennæ, 1762—1769.

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- DESF., Desfontaines, R. L. "Fl. Atlantica," 4to, Paris, 1798—1800.
- DESV., Desvaux, A. N. "Journal de Botanique," 8vo, Paris, 1826.
- DIL., Dillenius. "Hort. Elthamensis," folio, Lugd. 1774. "Hist. Muscorum," 4to, Oxford, 1741.
- DON, David, Librarian L. S. "Flora Nepalensis," &c.
- DON, George, a Forfarshire botanist, and the discoverer of many rare plants.
- DUCR., Ducroz (in Roemer and Schultz System).
- DUN., Dunal, E. "*Solanaceæ*," in D. C., "Prodromus."
- D.C., DC., and DE CAN., Decandolle (P.) "Prodromus Syst." 8vo, Gen. 1824—1858.
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- FR., Fries. "Novitiæ Fl. Suecicæ," 1828. "Symbolum Hier."
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- GMELIN, J. F. "Flora Sibirica," 4 vols. 4to, 1747—1769. "Reise durch Sibirien," 4 vols. 8vo, 1751—1753.
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- GUSS., Gussone, J. "Fl. Siculæ Synopsis," 8vo, Neapoli, 1842—1844.
- GRISEB., Grisebach, A., in "Linnæa."
- GUNN., Gunner, J. E. "Flora Norvegica Hafnia," 1766—1772.
- HAYN., Hayne, F. G. "Beschreibung der in der Arzneikunde gebräulichen Gewächse," 4to, Berlin, 1805—1846.
- HOFFM., Hoffman, G. F. "Deutschland's Flora," 12mo, 1791.
- HOPPE, D. H. "Botanische Taschenbuch," 12mo, 1794.
- HORN., Hornemann, J. W. "Flora Danica," 1813.
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- HULL, John, M.D. "The British Flora," 8vo, Manchester, 1808.
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- of botany, and especially of the plants in the south of Germany. The most celebrated is "*Floræ Austriacæ icones*," 5 vols. folio, 1773—1778.
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- JUSS., Jussieu, A. L. de. "*Genera Plantarum*," 8vo, 1789.
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- KÜTZ., Kützing, T. F., a writer in "*Linnæa*."
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- LAM., Lamarck, M. de la Marek. "*La Flore Française*," 1778—1793.
- LEDEBOUR. "*Fl. Rossica*," 1841—1852.
- LEERS. "*Fl. Herbornensis*," 1789.
- LEHMAN, J. G. C., author of "*Monographs on the Orders Asperifoliæ (Boraginaceæ), Primulaceæ*," &c., 1818, 1830, 1838; "*Plantæ Asperifoliæ*," 4to, Berolini, 1818.
- LEJ., Lejeune. "*Compendium Floræ Belgicæ*," 12mo.
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- LINN., Linnæus, the illustrious reformer of botanical nomenclature; the inventor of the Linnæan systems of Botany, Zoology, &c.; and the author of numerous estimable works on Natural History.
- LOIS., Loiseleur Deslonchamps. "*Fl. Gallica*," 1828.
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- M. ET K., Mertens and Koch. "*Deutschland's Flora*," 1823—1839.
- MEY., Meyer, G. F. W. "*Chloris Hannoverana*," 4to, Goettingen, 1836.
- MILL., Miller, P., author of the "*Gardener's Dictionary*," and curator of the Chelsea Botanic Gardens, 1731.
- MÖENCH, a German botanist, author of a "*Flora of Hesse*," 1777.
- MOORE, T., curator of the Botanic Gardens, Chelsea; author of a "*Hand-book of British Ferns*," 12mo, Lond. 1853—1857.
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- REICH. or RCHB., Reichenbach. "Planta Criticæ," 4to, vols. i.—x., 1823—1832. "Icones Fl. Ger.," 4to, vols. i.—xiv., 1834—1850. An eminent German botanist, author of "Plantæ Criticæ," and "Flora Germanica" (not completed), pictorial works, justly celebrated for the exceeding accuracy and beauty of the delineations.
- RETZ., Retzius, A. J. "Obs. Botanicae," folio, Lips. 1779—1791.
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- ROBSON, an English botanist, author of papers in "Linn. Trans." and of a "Flora."
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- ROSTK., Rostkovius, F. W. G. "Diss. Bot. de Junco."
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- SALISB., Salisbury, R. A. "Paradisus Londinensis," Lond. 1806.
- SAV., Savi, C. "Botan. etruscum," 4 vols. 8vo, Pisis, 1808—1825.
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- SCHR., Schreber, J. C. D., a famous German botanical writer, 1790.
- SCOP., Scopoli, J. A. "Flora Carniolica," 8vo, Vienna, 1772.
- SCHM., Schmid, F. W. "Flora Boëmica," 1793.
- SER., Seringe, N. C. "Musée helvétique d'histoire naturelle," Berne, 1823.
- SIBTH., Sibthorp, Professor John, the famous originator of the "Flora Græca," also the author of a "Flora Oxoniensis."
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- SMITH, the Rev. G. E., author of the "Plants of South Kent."
- SM., Smith, Sir E. J., the *facile princeps* of British botanists, author of "Flora Brit.," "English Flora," "English Botany," and of many other works on indigenous and exotic plants.
- SOND., Sonder.
- SOWERBY. "English Botany," 2nd edition, 8vo, Lond. vol. i.—viii.
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- STEV., Stevens, C. A. "Annals of Natural History."
- STURM. "Deutschland's Flora," 12mo, plates.
- SW., Swartz, O. "Synopsis Filicum," 8vo, Killiæ, 1806.
- TAUSCH, J. F. "Hortus canalius," Pragæ, 1823.
- TEN., Tenore, M. "Flora Napolitana," folio, 1811—1836.
- THORE, J., author of a "Treatise on French Grasses," 1803.
- TOURN., Tournefort, Pitton de. "Institutiones Rei Herbariæ."
- THUIL, Thuillier, J. L. "Flore des Environs de Paris," 1790.
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- VAIL., Vaillant. "Botanicon Parisiense," 1726.
- VAUCH., Vaucher. "Monographie des Orobanches," 4to, 1827.

- VENT., Ventenat. "Choix des Plantes," folio, 1803—1808.
- VEST, a German botanist, author of a "Botanical Manual," 1805.
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- VILL., Villars. "Histoire des Plantes du Dauphiné," 8vo, 1786—1788.
- VIV., Viviani. "Fl. Ital. Fragmenta," 4to, 1808.
- WAHL., Wahlenberg, Geo. "Fl. Suecia, Fl. Carpathorum," &c., 1814—1824.
- WALLR., Wallroth, C. F. W. "Schedulæ Criticæ de Plantis Floræ Halensis selectis."
- WALD. and KIT., Waldstein and Kitaibel. "Plant Hungar. rar. Icones," folio, 1802—12.
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- WEIHE and NEES. "Rubi Germanici."
- WEIS. (See Newman's "Hist. British Ferns," 2nd edition.)
- WULF., Wulfen, F. X., an Austrian botanist.

2. Divide this table into classes subclasses &c
See John Sims Addenda &c - p. 1.

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BRITISH PLANTS.

See this & following two pages

THE series of articles bearing the title "BRITISH PLANTS" will contain the following subjects, treated in as comprehensive and popular a style as is compatible with usefulness and scientific accuracy.

First.—An introduction to the science of Botany in general, not restricted to British plants, but applicable to the entire subject. The introduction will be subdivided into the following divisions. 1st.—Organography, or Structural Botany, which will comprise a brief and succinct account of both the simple and compound, or internal and external organs of plants, illustrated with diagrams. 2nd.—The physiology of plants, or the constituent parts of plants viewed as living organisms, each contributing either to the existence, the increase, or reproduction of the plant. 3rd.—Morphology, or the position, shape, and size of organs.

Second.—On the distribution of the British plants. This section, as its title implies, is confined solely to our native plants. It will comprehend—1st, The range of the British plants; that is, the area which they occupy, or the extent of country where they are found. 2nd.—The altitudes to which they reach, and the temperatures which they severally require to reach maturity. 3rd.—The special distribution of British plants as aquatic plants, woodland plants, meadow and upland pasture-plants, &c. &c.

Third.—On the classification of plants, applicable of course to all plants both British and exotic. This portion will embrace, together with systematic Botany or Taxonomy, an exact account of the import and right application of the terms species, genus, order, class, &c.

Fourth.—A description of the orders, genera, and species of the British plants. This portion will contain—1st, A clear, concise, and adequate description of the orders, illustrated with a diagram, representing certain generally well-known British plants, accompanied with illustrations of the parts most distinctive or characteristic of the order. Under the orders will be given ample descrip-

tions of all the genera and species of plants growing spontaneously in Great Britain, Ireland, and the Channel Isles.

Fifth.—A glossarial index to the whole subject, and an explanation of all the technicalities and unusual expressions contained in the work, with references to the paragraphs or sections where they occur.

This work, or series of papers, will embrace everything necessary for the student of the British plants, with the exact periods or seasons when they will be found, and the localities where they grow. The best methods of collecting them as specimens for the herbarium, to serve for identification in future years, will be particularly specified.

To the tyros or beginners in this science a few suggestions and cautions are deferentially offered.

1st.—To get as clear a notion as possible of the difference between inorganized and organized objects, as detailed in Taxonomy; also to learn the distinguishing characteristics of plants and animals. 2nd.—To beware of the deceptive and apparent but not real analogies between the constitution of objects forming the animal and the vegetable kingdoms; for example, the terms respiration and circulation are employed both in animal and vegetable physiology, but the functions themselves, as well as the organs whereby they are performed, differ much in the two kingdoms. In fact, the organization of plants and of animals is similar in nothing but in its results. The same objects—viz., the growth, preservation, and reproduction of both animals and plants are accomplished by means totally unlike,—as dissimilar as are the places which the individuals of these two great systems have to fill in the general economy of nature or providence. 3rd.—To observe and record facts; for example, the periods when certain plants are in flower, and certain trees are in leaf, or are leafing; the localities where certain plants are found, the soils where they thrive, the height to which they ascend, the numbers observed (their comparative rarity, scarcity, or abundance), the varieties of growth, colour of flowers, &c. All these particulars give not merely an additional interest to the study, but afford the means of comparing the vegetation of differently soiled and remote tracts, of ascertaining the exact effect of temperature on the vegetable kingdom, and, in fine, of extending the knowledge of geographical and economical Botany. 4th.—To collect specimens in all stages of the plant's growth; and, in order to have perfect specimens, the plant should be collected before the root-leaves decay or wither. A specimen should also exhibit both flowers and fruit; and if both cannot be

gathered and secured on one specimen, two should be gathered. Beginners would do well to collect every plant which they do not know, and to study it in a fresh state. Some pass by and utterly neglect species which form large groups of plants, with the observation that it is only a *Grass*—a species of *Hemlock*—a sort of *Daisy*, or a *Butter-cup*, or a *Fern*. All the apparatus necessary for distinguishing of closely connected and similar-looking plants is now easily procurable. A specimen-box or vasculum, and a small magnifier, will only cost a few shillings. A few shillings more, for a work descriptive of the plants and of the technicalities of the science, will set up a botanist. This will afford him the means of making his own walks instructive and interesting, and will not merely supply him with a motive for taking exercise in the open air—a practice conducive to his own health and morals—but will place him in a position for materially promoting science, by observing, recording, and communicating natural phenomena to those who are able to make them available, not to the advance of science alone, but to the progress of humanity.

INTRODUCTION

DEFINITIONS.

1. *Botany*, or *Phytology*, is the science which treats of the vegetable kingdom in general. It is divided into *structural*, *physiological*, *systematic*, *economical*, *geographical*, and *descriptive* Botany. *Structural* Botany treats of vegetable anatomy, or the organization of plants. Vegetable physiology treats of plants as organized objects, and as beings capable of certain organic functions. Systematic Botany treats of the arrangement or classification of plants. Economical Botany treats of the uses of plants, in the economy of nature generally, and also of their adaptation to the wants of man, and to the various and numerous orders of the animal kingdom in particular. Geographical Botany treats of the laws which regulate the production and distribution of plants. Descriptive Botany treats of the analogies, affinities, relations, and distinctive characters of divisions, classes, orders, genera, species, and varieties of plants.

STRUCTURAL BOTANY, OR ORGANOGRAPHY—ELEMENTARY OR SIMPLE INTERNAL ORGANS.

2. *The Cell, Cellular Tissue, Forms and Arrangement of.*—The simplest element or first principle of all plants is the cell, a minute

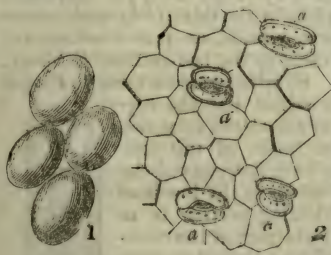


Fig. 1. Appearance of the cells before they assume the hexagonal shape by compression.

Fig. 2. Appearance of the cells when affected by mutual pressure.

vesicle generally of a roundish or egg-shaped form, consisting externally of a very thin membrane (exceedingly fine tissue), replete with juices interspersed with minute granules (small grains) of amylaceous, resinous, or other products, which appear to be peculiar secretions of the vesicles themselves. By mutual pressure these cells usually assume a hexagonal shape, but their figure varies in different plants, and is sometimes variable in the same plant.

The cells, by union or agglutination or extension, form tubes of greater or less length. These tubes are either placed on each other by their ends, or the ends slightly overlap each other, the membrane disappearing at the point of coherence.

Porous fibrous or *spiral cells* are formed by the disposition of an internal lining formed of the juicy and other matter contained in the interior of the cell, leaving portions of the inside of the cell-wall uncovered, which portions appear more transparent than the covered parts. Fibrous or spiral cells are produced by a similar internal lining of an elastic fibre which is coiled up on the inside of the tubular or elliptical or spherical cell. The development of the cell is one of the obscure subjects of botanical science.

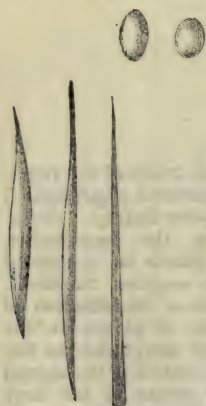


Fig. 3.—Modifications of the cell.

3. *Vascular Tissue*.—This tissue, which differs from cellular tissue chiefly in form, is divided into—1, *Woody Fibre*, or ligneous tissue. 2, *Fibro-vascular tissue*. 3, *True spiral vessels*. 4, *Spurious tracheæ*. 5, *Porous vessels*. 6, *Lactiferous vessels*.

The first of these forms (they are all modifications of the cell) consists of a series of elongated tubes, either cylindrical or tapering (*fusiform*), adhering continuously, and forming cords, as in flax. These tubes have thick cell-walls, and are disposed in bundles; the solid parts consisting of the stems, fibrous bark, &c.

The second form is less consolidated, or more loosely united than the first form, with a spiral coil on the inside of the cell, or with the interior of the cell marked by rings, dots, or bars. The spirals are complete in the third form, and can be unrolled. These vessels, or true *tracheæ*, are present and obvious in the leaf-stalk of Cabbage, Geranium, &c. Spurious tracheæ consist of separate rings, (somewhat like the segmentary parts of annulated animals), coiled up in the inside of the cell-wall. The fifth form (porous vessels) are cylindrical tubes, in the inside of which the thickening matter is so deposited as to leave part of the membrane uncovered, and thus the whole assumes a dotted or pitted appearance. (See Fig. 7.)

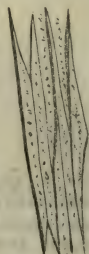


Fig. 4. Porous and fibrous cells.

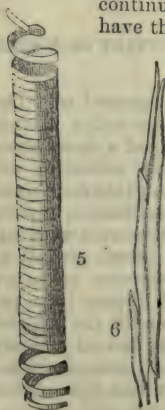


Fig. 5.—Spiral or fibrous cell. Fig. 6.—Woody fibre, several bundles adhering together.



Fig. 7.

The sixth form of the tissue is called the *lactiferous ducts*, a series of branching vessels by which the nutritious sap is conveyed to all parts of the plant. (See Fig. 8.)

They are chiefly found in the under surface of the leaves, and under the bark. These juices are copious in Euphorbias, Poppies, Celandine, &c.

The cellular tissue is the most important elementary organ, both in the vegetable and animal kingdoms. In plants it is universally diffused; every plant contains more or less of this substance; and plants of the lower orders are entirely composed of it. The higher orders of Cryptogams contain ducts (vascular tissue), and hence the Mosses, Lycopods, Ferns, and Equiseta, are named *plantæ ductulosæ* (ductulose plants); but true *tracheæ* (air-vessels) are not present in any of these. The lower orders of Cryptogams, viz., Liver-worts, Lichens, Funguses, and Algæ (sea-weeds and fresh water Algæ), are without ducts, and hence they are called *plantæ eductulosæ* (plants without ducts). Every plant in the earliest stage of its growth is solely composed of cellular tissue; and it is only when the plant has made considerable progress in growth that it is capable of producing the higher or more complex kinds of elementary tissues. Nothing can be simpler than the primary elementary principle of vegetative existence. The simple cell is both the original germ and the parent of all the other simple or internal organs. The whole vascular



Fig. 8.

system is derived from the cell; the vascular tissues are similar to the cell, both in structure and chemical qualities, although modified in such various ways as to make them capable of performing the various operations in the economy of the plants to which they respectively belong. The circulation of fluids, both liquid and aeriform, and the various vegetable secretions, are dependent on the vessels or tissues, both vascular and cellular. This is admitted by all physiologists; but the precise functions of each and all of them have not hitherto been satisfactorily ascertained.

4. The *Compound or External Organs of Vegetation* are twofold, and are formed by combinations of the simple or elementary organs, or of the cellular and vascular tissues. There are, 1st, *Organs of nutrition, with their appendages*. 2nd, *Organs of reproduction*. The former of these two grand divisions comprehends the *epidermis*, or usual covering of all the external organs in some stage of their growth,—the *root*, the *stem*, the *leaves*, with their several appendages or appurtenances, such as down, hair, bristles, prickles, spines, scales, horn, &c.

5. *Epidermis and its appendages* (see Index).—This organ is the superficial film or thin pellicle which covers every part of the plant, when in a recent or young state, except certain apertures called the *stomata* (see Index and glossary). It is composed of layers or series or systems of layers, of compressed cells, which here are made to

assume a flattened or tabular shape with flexuous or wavy boundaries, without openings or spaces between the cells, as in the common cellular tissue. It is easily removed from the young plant, or from the recently produced parts of any plant; and it is very conspicuous on the stems of the Birch, which readily parts with its epidermis in all stages of its growth. The stomata, with which the epidermis is always furnished, are openings (apertures) between the epidermal cells. These openings (see Fig. 9) are surrounded or inclosed by two bent or crescent-shaped cells, which open or close the aperture accordingly as the atmosphere is dry or moist. These stomata (mouths or openings) communicate with the intercellular spaces in the interior of the plant, and are generally considered to be the external organs of respiration, *i. e.*, they maintain a communication between the internal organization of the plant and the external air. The number of stomata varies in different plants, and in different parts of the same plant. They are always most numerous on the under surface of the leaves, and are often entirely absent from the upper surface, especially where the leaves are of a coriaceous (leathery) texture, with a dense shining or glossy cuticle, as in the leaves of the Laurel, Rhododendron, Box, and similar-leaved plants. They are not found on any of the cryptogams (flowerless plants), excepting in some of the higher orders, where ducts are present. They are also absent from the submerged parts of aquatic plants, and do not exist on certain parasitic species.



Fig. 9.

6. The epidermis, the root, the stem, and the leaves, are essential organs; the down, hair, bristles, glands, prickles, thorns, &c., are appendages or appendicular organs: the latter are not essential to the existence of plants in general, as the root, stem, and leaves are; for without these, in some form or other, the plant cannot exist—but many plants are without the former. The appendages are no doubt essential to the plants on which they are found; but they are not developed on all plants, and therefore are not essential to all.

The epidermal appendages are—down, hair, bristles, glands, scales, prickles. Hairs in plants vary as in animals; being either soft and silky or rough and rigid—either short, like down, or long and wool-like. They are all modifications of some elongation of the cellular tissue of the epidermis; being sometimes a simple prolongation in one piece (1-celled), sometimes forming a series of cells (see Fig. 10, *a c*), sometimes simple, sometimes branched (Fig. 10, *c d*), sometimes erect, sometimes horizontal, at other times depressed. Prickles differ from hairs chiefly in being a larger mass of indurated cellular tissue, more or less enlarged at the base, and tapering into a point; bristles (setæ), with or without glands, are intermediate between hairs and

prickles, being more rigid and stouter than hairs, and not so strong as prickles. Stings are sharp pointed hollow bristles, analogous to

1-celled hairs, but perforated at their tips, and seated on a glandular mass of cellular tissue, wherein the poisonous fluid is secreted. When the hand, or any part of the skin or other object, presses gently against the bristly hairs, then the pressure of the base of the hairs against the gland causes the fluid secreted therein to ascend the tube and enter the skin by the puncture made by the point of the hair or bristle. *Glands* are either sessile (not stalked) or stipitate (with a longer or shorter stalk); they are either single cells or an agglomeration of cells, containing aromatic, saccharine, or other materials, depending on the

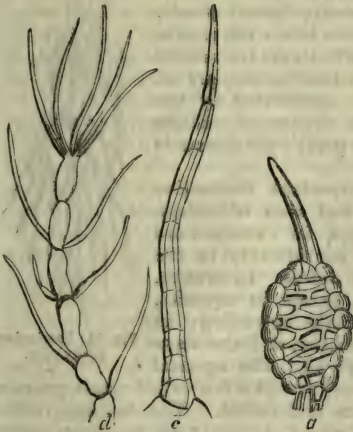


Fig. 10.

nature of the plant on which they grow. *Scales* are flat excrescences, also originating in the epidermis; they are common on the stalk (stipe) or midrib of the fronds of Ferns.

7. *The Root and its appendages*.—This organ is the descending axis of the plant, the stem being the ascending axis. It grows downward toward the earth's centre, avoiding the light; the stem, on the contrary, has a tendency to an upward direction, and towards the light. The form of the root is modified by the manner of its growth. When the growth is perpendicular, penetrating deeply into the soil without branching, the tap-root is formed. When this is short and succulent, the conical root, as in Carrot, the fusiform (spindle-shaped) root, as in Radish, or the turbinate (top-shaped) root, as in Turnip, are respectively produced. When the root ends abruptly under the crown (place where the stem and root are connected), the root is called *præmorse* (bitten off) or *truncate* (cut across), as in *Scabiosa succisa*; it may be contorted (twisted) as in Bistort. When the root below the crown is divided into a number of fine thread-like divisions, it is called a fibrous root (the roots of grasses are usually fibrous); when these divisions are short and thick (fleshy or succulent), the root is termed *fasciculate* (Fig. 11); when swollen nodules are developed, the root is *nodulose*; when roundish knobs are produced on the fibres, the root is named tubercular; when these knobs are small, the root is granular. Roots are also globular (round), ovate (egg-shaped), palmate (hand-like), coralloid (coral-like). Most of these latter forms of

the root are exemplified by the *Orchids*. These fleshy tubers, knobs, grains, &c., are appendages of the root, and usually contain more or less of a farinaceous, nutritious substance. When the tap-root produces strong lateral shoots, or if it is divided at some distance below the crown, it is called a branching root. Fibrils are the minute thread or hair-like processes which accompany all sorts of roots; and these are terminated by the spongioles (little sponges), or organs of suction whereby the chief part of the plant's nutriment is imbibed.

8. Roots often afford important distinctive characters of species, genera, and even of orders. The roots of grasses and sedges, for example, are fibrous, and the fibres differ considerably in the respective species of these two orders. In grasses, the fibres are always slender, except in aquatics, and generally tufted, or slightly spreading; in sedges, the fibres are usually thicker, and the roots have a greater tendency to spread. The agrarian grasses (upland and field grasses) except a few called couch grasses, have their roots always fibrous and tufted. The bulbous rooted grasses of dry, sandy, banky places, are only an apparent, not a real exception, for the bulbous part is usually only an enlargement of the lowermost nodule or nodules of the stalk. When the fibres of sedges are much enlarged or fleshy, they are also scaly, and may be regarded as underground stems; the scales are considered to be abortive or rudimentary leaves. In the orders *Cruciferae* and *Umbelliferae*, the roots are generally perpendicular, or more or less oblique, or inclining to a horizontal position; they are seldom or never fibrous and tufted. In these two orders they are usually conical or fusiform, or top—or egg-shaped, slightly branched, and fibrous below, generally more or less thick or fleshy, but often hard and woody. The roots are much developed in the cultivated species of Radish, Turnip, Carrot, Parsnep, &c. &c.; in these, the roots have a stem-like structure, and are chiefly distinguished from stems by their greater succulency. The following exceptions to this general mode of development, occur in the following *Umbelliferous* genera, viz., in *Eryngo* (Sea-Holly) *Crithmum*, *Ægopodium* and *Imperatoria* the roots are creeping, in *Sanicle* thick (fleshy) fibres, in Chervil and Hydrocotyle fibrous, in *Bunium* and *Cicula* tuberous, in *Oenanthe* mostly tuberous. In *Geraniaceae*, the roots are usually woody and tapering, rarely tuberous, sometimes spreading, but never tufted. The British Orchids and the European also are distinguished by fleshy roots which are variable in form. The Potato is a tuber produced on the long fibrous roots of *Solanum tuberosum*. The well-known *Arum maculatum* has a knobby, fleshy root, which, when deprived of its acridity, is said to be very nutritious. *Saxifraga granulata* is distinguished



Fig. 11. Fasciculate fleshy root.

by granular tubercles (small tubers). *Scrophularia nodosa* has thick knobby tubers. *Ranunculus bulbosus* is known by its root, which is bulbous, like a turnip-radish. There are many modifications of this organ besides the above-mentioned, and they will be noticed in the description of species; the above common forms are given to assist the student in learning the terms descriptive of the root in general, and of its varieties and appendages.

9. *The Stem and its appendages.*—In several plants with truncate or præmorse roots, the *caudex* (main trunk of the root) is only slightly extended in a downward direction, so in certain plants the stem is scarcely, or in any perceptible degree developed above ground. These underground stems are not very numerous in the vegetable kingdom; but they do occur, and present a remarkable contrast to the normal or common state of stems which are generally developed above ground. Hence stems are either *subterranean* or *aerial*. The former is distinguished from the true root by its tendency to produce leaf-buds at regular intervals; these are never produced in true roots. The most important forms or varieties of the underground stem are as follow:—The rhizome or root-stock, is a creeping sort of stem, partly underground, producing roots on its under side, and leaf-buds on its upper side. This is exemplified in many of the flag-genus (*Iris*). The *soboles* is entirely underground, producing roots at one end, and leaves at the other. This form is exemplified by the *Couch-grass*, *Panic grass*, &c. *Bulbs* of onions, *corms* of *Crocus*, *tubers* as the Potato and Dahlia-root, and the *crown* of the root as in the Primrose, are all varieties of the underground stem.

10. *The aerial stem* is distinguished from the underground stem, by being always above ground, and by producing leaves and flowers. In herbaceous plants, which always continue in a more or less soft condition, and speedily decay after producing the fruit, the woody stem is never developed. In trees and shrubs the stem is sometimes of very long duration. An intermediate sort of stem is produced by many plants, connecting the strictly herbaceous with the woody (ligneous) stems. Hence stems are divided into the woody stem (trunk, *truncus*) of long duration, and the herbaceous stem, or stem of annual duration, and the intermediate form of the stem which is woody at and near the base, and herbaceous in the upper part, the latter perishing annually, the former lasting often for several years. Lavender, Wormwood, Wallflower, and Thyme are examples of intermediate or half-woody stems (*suffruticose*). The stem of trees is called a *trunk* (*truncus*), the short stem of a shrub which branches from near the base is called *caudex*. An unbranching stem, as in Palms, is called a *stipe* (*stipes*). The hollow stalk of grasses is sometimes termed a *culm*. Stalk (*caulis*) is a general term applicable to all herbaceous stems. The form of the stem or stalk is usually round and tapering, but in monocotyledonous plants, such as Palms, it is cylindrical. It is not seldom angular, sometimes fluted, and often ridged and furrowed; hence important distinctive marks are derivable from the

stem. The general direction of the stem, or ascending axis of the plant, is vertically upwards; to this, however, there are many exceptions. Some stems are not firm enough to grow or remain in an erect position, and these consequently either cling to contiguous plants or objects for support, or fall to the ground. When the stem is quite prostrate (*procumbent*), and roots at the leaf-joints, or otherwise, it is called *creeping* or *rooting* (*repens*); when its lower part rests on the ground, and the upper part is erect, it is called *reclining* or *recumbent*; when, like the Ivy, it climbs on trees, walls, rocks, or *banks*, it is named *scandent*; when like the Honeysuckle, it twists itself round trees or plants, it is called *voluble*.

11. *Internal Structure of Stems.*—All permanent or woody stems of plants which grow naturally in the British Isles, or are capable of enduring the alternations of heat and cold incident to this climate, belong to the Dicotyledonous division of plants—a term which will be explained in the section which treats of the seed. This division of plants is also termed *Exogenous* (see Index and Glossary), a term derived from the structure of the stem, or from the mode in which the successive layers of wood are produced and arranged. The centre of the Dicotyledonous or Exogenous stem consists of a greater or less cylindrical mass of cellular tissue (see Fig. 12). The central portion *a* represents the pith (cellular tissue), which is very large in stems of the first year's growth; *b* is the series of woody layers; and *c* the bark with its hairy epidermis. The pith is surrounded by a ring or tube, composed chiefly of ducts and tracheæ; this tube is called the *medullary sheath*. Between this sheath, or tube, and the epidermis there are two distinct layers formed; the inner one is the woody layer, and the outer one, viz., that between the woody layer and the epidermis, is the bark. These three distinct portions of the stem represented in the cut are the production of one year. In permanent woody stems, a new layer of woody tissue is annually deposited between the bark and the layer of wood formed during the previous year. In successive years, new layers of wood are successively deposited on the outside of the former deposits. The half fluid, or viscous mass of cellular and vascular tissues, with their contents, form annual layers of wood and bark, the latter receiving all its increase interiorly; hence a layer of new wood is formed from the indurated *cambium* completely investing the former layer, or layers, and a corresponding addition is made to the inner surface of the bark. These annual layers, or concentric rings of wood, are very conspicuous in transverse sections of the common forest and fruit-trees of this country; and the number of such layers is always equal to the number of years of the life of the

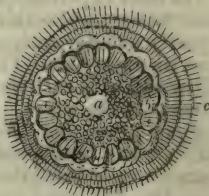


Fig. 12.—A transverse section or slice of Maple (*Acer campestre*); *a*, the cellular tissue (pith); *b*, the series of woody layers; *c*, the bark.

tree. The pith gradually diminishes by pressure of the surrounding layers, which have a tendency to consolidate the wood; and hence the wood is denser at the centre than at the circumference. The bark, or cortical layers, do not, after a certain period in the age of the tree, materially increase in thickness. Atmospheric influences probably prevent any considerable increase of the bark; for as it is pushed outwards it cracks, and either falls off or is weather-worn. Besides the above-mentioned woody and cortical layers, there is in

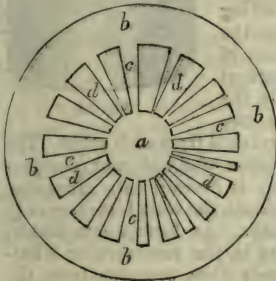


Fig. 13.

all dicotyledonous trees a system of radiating layers of cellular tissue connecting the pith and the bark, forming a series of walls wherein the bundles of woody fibre are developed (see Fig. 13). This diagram illustrates the position of the different layers which compose the wood. *a* represents the pith; *b*, the bark; *c c c*, plates of cellular tissue connecting the bark and pith; *d d d*, woody fibres interspersed between, and contained by the medullary rays. The medullary rays are very conspicuous in the Beech and Hazel, and among carpenters are known by the term

silver grain. Their use is to consolidate the wood by uniting the several series of vascular bundles to each other as well as to the medullary sheath. Hence there are four characters by which we distinguish the dicotyledonous or exogenous stem from every other



Fig. 14.

woody or permanent stem; viz., 1st, the central pith; 2nd, the concentric rings of wood; 3rd, the bark; and 4th, the medullary rays or radiating layers which connect the medullary sheath with the cambium (see Index).

12. The *endogenous* or *monocotyledonous* stem is not characterised by any of the above noted marks. The wood is not separable from the pith; but the whole substance of the stem is cellular tissue interspersed with bundles of vascular fibre, distributed in an irregular manner, never disposed in distinct layers. (See Fig. 14, which represents a portion of a monocotyledonous stem.)

The surface of the section *a* shows the whole undivided mass of cellular tissue, interspersed with separate bundles of woody fibre. In this kind of stem there are no concentric zones or woody layers, nor is there a distinct bark, neither are there any traces of medullary rays. No examples of permanent or woody stems of this kind grow naturally in our climate; they are mostly confined to tropical and equinoctial regions. The cut (Fig. 15) shows a segment

and section of our common Reed (*Phragmites* com.); *a* is the hollow portion, *b* the solid part of the culm, *c* a portion of the sheath.

True *acrogenous* or *acotyledonous* stems are only developed in certain species of the very highest order of cryptogams, viz., in Tree Ferns. They differ from the last described stem chiefly in having less vascular tissue, and by increasing at the summit only, and not in diameter.

13. The stem, which is the connecting medium of the root and leaves, and bears the branches (when present) and the organs of fructification, is one of the most important organs in the economy of the plant. By the structure and development of this part the three grand divisions of plants are distinguished from each other. The whole vegetable kingdom, with the exception of *Amphigens* (comprehending the Lichenes, Fungi, and Algæ), is divided into *Acrogens*, *Endogens*, and *Exogens*. In *Acrogenous* plants, the stem increases only at its point or extremity, not in its diameter. In *Endogenous* plants, the increase of the stem is internal; that is, the cambium, or whatever it is that forms the bundles of woody fibre, proceeds from the leaves, and penetrates the softest part of the stem, which is its interior, these fibres are arrested at the circumference, which is by far the densest portion of the stem, and prevents increase in that direction. The *exogenous* stem increases externally, as has been already shown (Sec. 11). In *Acrogens* and *Endogens* the stem is simple (unbranched); in *Exogens*, the stem is usually branched. Buds are generally produced in the latter-mentioned stems, but rarely in the former.

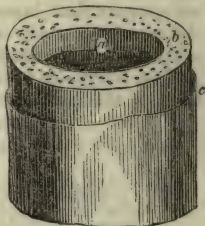


Fig. 15.

Several orders are distinguished by the stem; for example, the structure of the stem in the *Coniferae* (Pine-tree family) is different from that of all other exogenous stems, in being without medullary rays; and in the young stem the branches are always whorled (radiating from the same point of the stem). In the following orders the stems are prostrate, climbing or twining; viz., *Fumariaceæ*, *Leguminiferae* and *Rosaceæ* in part; *Cucurbitaceæ*, *Araliaceæ*, *Apocynaceæ*, *Convolvulaceæ*, *Solanaceæ*, and *Scrophulariaceæ* in part; *Polygonaceæ* and *Aristolochiaceæ* in part. Certain genera bear strong shoots the first year, which shoots bear flowers and fruit the second year, as *Rubus*. Several genera, like *Fragaria* (strawberry), produce prostrate, creeping stems. Woody stems distinguish the orders, *Berberidaceæ* in part, *Rhamnaceæ*, *Celastraceæ*, *Grossulariaceæ*, *Araliaceæ*, *Cornaceæ*, *Loranthaceæ*, *Caprifoliaceæ*, *Ericaceæ*, *Ilicineæ*, *Aquifoliaceæ*, *Oleaceæ*, *Apocynaceæ*, *Eleagnaceæ*, *Thymeliaceæ*, *Empetraceæ*, and portions of *Leguminiferae* and *Solanaceæ*. Several *Labiatae* are furnished with half-shrubby stems; also a few *Cruciferae*, most of the order *Cistaceæ*, and several *Euphorbias*. *Coni-*

feræ and *Amentiferæ* comprehend most of our forest trees. Some orders have usually hollow stems; viz., *Ranunculaceæ* and *Leguminiferæ* and *Dipsacæ* in part; most of the *Umbelliferæ*, all the *Gramineæ* and *Elatinaceæ*; and a portion of the *Compositæ*, *Juncaceæ*. The pith is largely developed in the shoots of *Roses*, *Brambles*, *Elder*, many of the *Rushes*, and in a large portion of the *Cyperaceæ*. The stems in *Labiata*, and in sub-order *Stellate*, are quadrangular, and chiefly so in *Lythraceæ*, *Onagraceæ* and *Gentianaceæ*. In *Cyperaceæ* the stems are usually triangular. Some genera have fluted stems, as *Rubus*.

14. *Leaves* are more or less thin, flattened expansions, consisting of bundles of vascular tissue, which bundles constitute the skeleton or frame-work of the leaf; the more prominent bundles are called nerves, and the smaller ones veins or veinlets; their disposition in relation to each other is called *nervation* or *venation*. The shape or outline of the leaf depends on, or is modified by, the length and relative position of the nerves. When the middle, or principal nerve (an extension of the bundle of fibres forming the petiole, or leaf-stalk if present) divides into branches, and when all the branches diverge in the same plane, the leaf is flat, and this may be called the normal

state of leaves, (Fig. 16); when the nerves diverge in different planes, the leaf is orbicular (round) as the leaf of common sheep-rot (*Hydrocotyle vulgaris*.) (Fig. 17.) In succulent or fleshy leaves, such as the leaf of the *House-leek*, *Sedum*, several *Pinks*, &c., the nerves spread in different planes, and the *parenchyma* (cellular tissue) is so much developed as to conceal the nerves, which consequently are neither prominent nor visible, as they are in the greatest number of leaves. The leaf



Fig. 16. Elm Leaf.



Fig. 17. Leaf of *Hydrocotyle vulgaris*.

when complete consists of two parts (Fig. 18,) *a*, the *petiole*, or leaf-stalk; *b*, the *lamina* or blade. The petiole connects the leaf with the branch or stem, and is composed of the unexpanded bundles of fibres, covered by the epidermis; the ramification of the nerves constitutes the skeleton, and the veins and veinlets, with the cellular tissue and epidermis, constitute the entire leaf. When the petiole is not present, the leaf is termed sessile. Sessile leaves often partially or entirely surround the stem, and in this case they are termed *semiamplexicaul* or *amplexicaul* (half embracing, or quite surrounding the stem.)

15. The most obvious division of leaves is into *simple* and *compound*. In simple leaves the limb consists of one piece, either quite

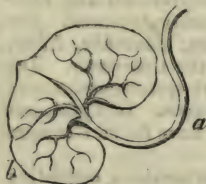


Fig. 18.

entire, or variously indented, cleft or divided at the margin. (See Fig. 18, an entire leaf; 17, a crenate, and 16, a toothed or incised leaf.) Compound leaves are composed of one or more pieces, called leaflets, each of which is jointed to the common

petiole or rach, as it is termed when the leaf is winged. (See Fig. 19, which represents a *pinnate*, or winged leaf.)

16. *Simple leaves*.—It has been stated that the shape or contour of the leaf is regulated or modified by the angle of divergence of the lateral or secondary nerves (the branches of the principal or median nerve), and by their length.

When the divergent nerves are but slightly distant, and extend from the base to the apex, inclosing only a narrow slip of parenchyma, the leaf is called *linear*. The leaves of grasses are familiar examples of this form. When the nerves extend from end to end, and are rather more distant in the middle of the leaf, the *lanceolate* form is produced. In these two forms the nerves usually diverge at the base, but in the second, viz., the lanceolate form, the relative length of the secondary nerves, and their wideness of angle produce a *lanceolate leaf*. (See Fig. 20). When the secondary or branching nerves are nearly

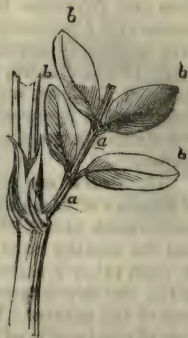


Fig. 19.—a the rach, b b the four leaflets of the compound leaf.

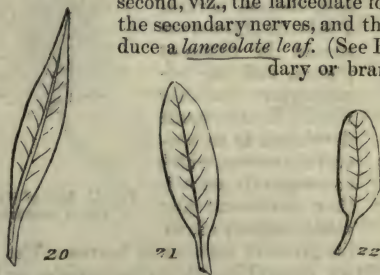


Fig. 20. Lanceolate leaf with branching nerves.—Fig. 21. Elliptico-lanceolate leaf.—Fig. 22. Oblong leaf.

of equal length, both at the base and apex, the leaf is elliptico-lanceolate. (Fig. 21.) The oblong leaf differs from the latter merely in being rather broader at the base and tip. (Fig. 22.) When the branching nerves are nearly equal, the leaf being obtuse at both ends, it is called a *rounded leaf*. (See Fig. 23.) This form, which is also termed orbicular, must not be confounded with the leaf of *Hydrocotyle vulg.* Fig. 17. In this latter the leaf is *peltate* (pelta a buckler); the nerves do not diverge in the same plane; in Fig. 23 the nerves do diverge in the same plane.

If the leaf be rounded at the base, and tapering at the top, having the basal nerves longest, it is called ovate (Fig. 24). If the upper nerves be longest the leaf is obovate (inversely egg-shaped), (Fig. 25).



Fig. 23. Rounded leaf.—Fig. 24. Ovate, lobed, or toothed leaf.—Fig. 25. Obovate, crenate, or crenated leaf, tapering downwards into the petiole.

The cuneate, or wedge-shaped leaf, is a slight variety of the last, with the apex flatter (less rounded).

If the basal nerves be prolonged downwards, forming obtuse angles with the middle or primary nerve, the cordate or heart-shaped leaf is produced (Fig. 26). When the secondary nerves are unequal, and diverge at unequal angles, the leaf is unequally cordate (Fig. 27).



Fig. 26. Cordate acuminate leaf.

When the lateral nerves exceed the median nerve, and the basal nerves are reflexed at very wide (obtuse) angles, the leaf is reniform, or kidney-shaped (see Fig. 28).



Fig. 28.—Leaf of *Asarum europaeum*. Reniform leaf.

When the parenchyma is deficient at the apex, and the upper lateral nerves longer than the lower, the leaf is obcordate (Fig. 29).



Fig. 27. — Unequally cordate acuminate leaf.

When the petiole separates at the base, and forms several nearly equal nerves, each of which is furnished with lateral



Fig. 29. Obcordate leaf.

When the petiole separates at the base, and forms several nearly equal nerves, each of which is furnished with lateral nerves, the leaf is lobed, as the Ivy-leaf, Mallow-leaf (Figs. 30, 31).

16. *Margin or edge of the leaf.*—When the margin of

the leaf is free from notches, scollops, indentations, teeth, lobes, &c., it is called entire (see Fig. 32).



Figs. 30, 31. Lobed leaves.

When the parenchyma is more developed at the margin than in the plane



Fig. 32. Margin quite entire, slightly wavy.

of the leaf, the leaf is undulate, crisp, or curled at the edge, as in many of the *Dock* genus. When there is a slight notch at the apex, the leaf is emarginate or notched (see Fig. 33).



Fig. 33. Notched elliptical leaf.

When the margin is furnished with rounded projections, the leaf is crenate or crenated (see Fig. 34).

If the projections be very small, and the incisions very shallow, it is crenulate (Fig. 17).

If the projections be longer and sharper, and more or less divergent, the leaf is toothed (dentate), (Fig. 16).

If the teeth be sharp and pointed upwards, the leaf is serrate or serrated, having teeth like a saw (Fig. 35).



Fig. 34. Cordate crenate leaf.

When the teeth are serrated, the leaf is called doubly serrated (Fig. 36).

The margin is said to be flexuous or sinuate when the projections are slight and far apart (Fig. 28). When the margin is divided half-way to the midrib the leaf is pinnatifid (Fig. 37); and when the lobes are more or less divided, the leaf is doubly pinnatifid, or pinnatifid with incised or cut lobes (Fig. 38).



Fig. 35. Serrated auricled leaf.

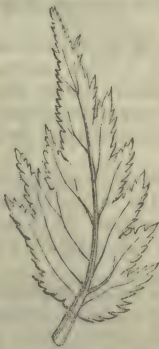
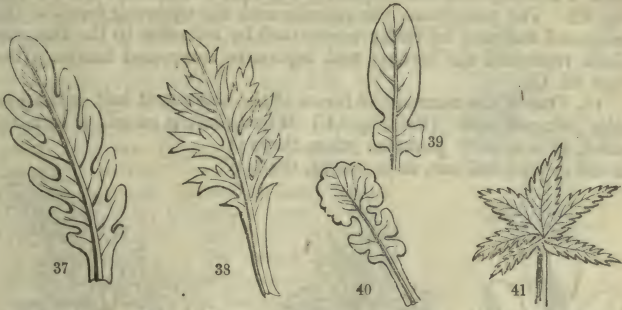


Fig. 36. A doubly-serrated ovate acuminate leaf.

When the incisions, as in Fig. 38, reach close to the midrib, the leaf is parted (partite). When there is only a pair of lobes, one on each side at the base, the leaf is hastate (~~sword-shaped~~), or auriculate (with little ears or projections), (see Fig. 39).

The lyrate or panduriform (fiddle-shaped) leaves differ from the

hastate leaf chiefly in having the sinus or unfilled portion of greater extent, and further from the base (see Fig. 40).



Figs. 37, 38. Pinnatifid and doubly pinnatifid leaves.

Figs. 39, 40. Hastate and Lyrate or panduriform leaves.

Fig. 41. Palmate or hand-like leaf.

When the nerves divide in a radiating manner from the base, and when the margin is deeply incised, or lobed, the leaf is *palmate* (hand-like) (see Fig. 41).

Compound Leaves.—The essential distinction between the simple and the compound leaf is, that the former may be, and often is, sessile; that is, it is united to the branch or stem on which it grows without the intervention of a leaf-stalk (petiole); the compound leaf is never sessile. Again, the distinct parts of the compound leaf are jointed to the petiole; the lobes of the simple leaf, however deep



Fig. 42. Strawberry leaf.



Fig. 43. Horse chestnut leaf.

the incision be, always form integral parts of the leaf. The leaflets of a compound leaf may be detached without tearing the substance of the leaf; the lobes of a simple leaf cannot be detached without

laceration. A compound leaf may have one leaflet or an indefinite number; but every leaflet must be jointed to the common petiole, or rach. The compound leaf is either *ternate* (like Trefoil or Strawberry), Fig. 42. The *quaternate*, the *quinate*, and the *septenate* forms of the compound leaf may be easily understood by referring to the two cuts which represent the ternate and septenate compound leaves. (See Figs. 42, 43).

18. One of the commonest forms of the compound leaf is the *pinnate* (winged) leaf. (See Fig. 44.) When there is no odd or terminal leaflet, it is equally pinnate; when there is an odd or terminal one, as in cut 44, the leaf



Fig. 44. Pinnate, with an odd terminal leaf.



Fig. 45. Interruptedly pinnate leaf.

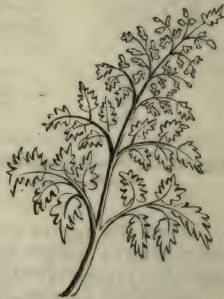


Fig. 46. Bipinnate or compound leaf.

is *unequally pinnate*. When there is an abortive or minute leaflet between the lateral leaflets, the leaf is *interruptedly pinnate*. (See Fig. 45.) When there is only one series of leaflets on each side of the common petiole or rach, the leaf is simply or singly pinnate (as in Figs. 44 and 45); when the branches are again subdivided, the leaf is *bipinnate* (doubly pinnate). (See Fig. 46.) Leaves may be triply compound if the branches be again subdivided. They may be also twice or thrice ternate by subsequent subdivisions of the lateral branches.

The *pedate* leaf is intermediate between the simple and compound leaves. The petiole is branching, but the leaflets are not jointed. (See Fig. 47.)



Fig. 47. Pedate leaf.

19. *Position or Arrangement of Leaves.*—Leaves occupy various positions on the stem or branch. Some plants produce only root leaves, and in this case the leaves grow from the crown of the root, or under-ground stem, and are usually disposed in what is termed a *rosette* (arranged somewhat like the petals of a double rose). When

two leaves are produced from the same point of the stem, and on opposite sides of it, they are called *opposite*. In some genera and species, the opposite leaves are also *connate* (growing together by their bases). When more than two leaves are produced at the same point, the leaves are *whorled* or *radiate* (verticillate). (See Fig. 48.) When the leaves are produced on opposite sides of the stem, but not from the same point, they are *alternate*; if disposed irregularly, neither opposite nor alternate, they are *scattered*. If there be many leaves, the stem is leafy; if there be none, or very few, it is leafless, or nearly so. When, by the non-extension of the branch or stem, the leaves are in approximation to each other, they are *tufted*, or *fasciculate*. When closely arranged along the stem in two rows, they are *distichous*; and when contiguous, and so arranged as to cross each other in four



Fig. 48.



Fig. 49.



Fig. 50.

rows or ranks, they are *decussate*. The leaf is *decurrent* when its midrib passes down the stem or branch. (See Fig. 49). It is *perfoliate* when the lobes of the base unite and embrace the stem. (See Fig. 50.)

20. *Appendages of Leaves*.—Several of these have been already described under the section Epidermis and its appendages, viz., prickles, glands, setæ (bristles), hair, &c. The most important of those remaining to be described are—*stipules*, *tendrils*, and *thorns*. In *Salix* (Willow) and some other plants, the stipule is like a small leaf. (See Fig. 51). *a* is the stalk or branch, *b b* the stipules, *c* the leaf, and *d* the petiole. The stipules may be united as in the *Roses*. (See Fig. 52.) *a* is the branch, *b* the compound leaf, *c c* the stipules, cohering to each other and to the petiole, by their edges, forming a petiolar stipule. The order *Polygonaceæ* is characterised by the universal presence of membranous sheaths, which are a sort of stipule, or appendage of the leaf. The *Gramineæ* have a scarious crown above the sheath,

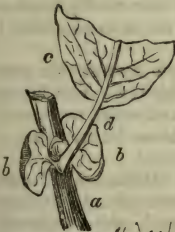


Fig. 51.

which is named a *ligule*. (See Fig. 53.) *a* the sheath, *b* the blade of the leaf, *c* the ligule. In *Umbelliferous* plants there is a loose sheath at the base of the petiole, which embraces the branch or stem, and is termed *pericladium*. In *Ranunculaceæ* the petioles are sheathing.



Fig. 52.

Tendrils are a prolongation of the common petiole, and are common in Leguminiferous plants, as the Pea, Tare, &c.; and when the tendril is present there are usually fewer leaflets; and there cannot, in this case, be a terminal or odd leaflet, which, in other cases, usually terminates the growth of the petiole or rach. In several species tendrils appear to be metamorphosed leaflets,



Fig. 53.

as in the Pea, the Vine, &c. The tendril is either simple or branched, but always curls or coils up. *Thorns* are often metamorphosed (changed) or abortive branches; but in some cases, as in the common Berberry and Furze, they are abortive stipules or leaves, such abortion being caused by the deficiency of parenchymatous matter.

21. *Vernation or Prefoliation of Leaves*.—Before the leaves expand they are closely folded up in the leaf-bud, and their state when so folded is called vernation, or prefoliation. When the plaits or folds are disposed parallel to the midrib, the prefoliation is longitudinal. This mode of prefoliation is exemplified by the Grasses. When so folded as that the apex and the base approach, the prefoliation is *transverse*. If rolled up, as in Ferns, from the apex to the base, it is *circinate*; if folded like a fan, *plicate*. When rolled inwards or outwards it is *involute* or *revolute*; as Violet and Rosemary, Dock, &c. When they simply touch each other in the bud, they are *valvate*, and when they overlap each other, they are *imbricated* (tiled). When they cover each other, they are *conduplicate* or *equitant*, as in the Iris (Flag). These positions are also common to the flower-bud.

Leaf-buds are both terminal and lateral; by the former, the stem or branch is prolonged; by the latter, it grows thicker. The lateral buds are always situated in the angle of the leaf and stem, or branch. Buds not subtended by a leaf are called anomalous buds, being of rare occurrence.

22. *Importance of Leaves in distinguishing Divisions, Classes, Orders, Genera, and Species of Plants*.—The two grand divisions of Flowering Plants can be readily known from each other, either by the nervation, the structure, the outline, or the articulation of the leaf—generally by one, but usually by all of these characters conjointly taken.

In monocotyledonous plants the nerves of the leaf are parallel, as in *Gramineæ* (grasses). (See Fig. 54). In dicotyledonous plants the nervation is never parallel, but more or less divergent and branched. (See Figs. 16, 18.) The nerves are not always parallel in Monocotyledons, but they do not branch, and when connected by veins or veinlets, these are usually straight and parallel to each other, not crooked and divergent, as in Dicotyledons. In the former the leaves are always simple and entire at the margins; in the latter they are frequently compound, and seldom quite entire. In Monocotyledons the shape, figure, or contour, is linear, like grass, or some modification of this form;

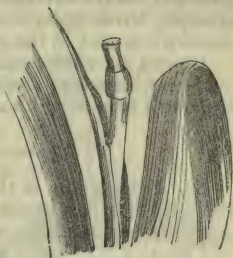


Fig. 54.

in Dicotyledons the leaves are multiform (of many shapes). In the latter the leaves are distinctly articulated to the stem; in the former this is rarely the case. In *Dictyogens*, a small division intermediate between *Endogens* (Monocotyledons) and *Exogens* (Dicotyledons), the leaves have branching nerves, but the leaves in these plants are simple, and of regular outline. The following orders are distinguishable by their leaves:—*Gramineæ* and *Cyperaceæ* by linear, narrow leaves; the former (Grasses) have slit sheaths, the latter (Sedges) have the sheaths usually entire. *Ranunculaceæ* for the most part have divided leaves, with sheathing petioles. *Umbelliferæ* have generally compound leaves, which are pinnate, bipinnate, or tripinnate; or ternate, or biternate, or triternate; they have also a broadly sheathing petiole. *Leguminiferæ* have usually compound leaves, which are either ternate or pinnate. *Rosaceæ* is also generally distinguished by its compound leaves, which are either ternate, or quinate, or pinnate, or interruptedly pinnate. Narrowly linear and sharp-pointed leaves distinguish *Coniferæ*. Many plants are distinguished by the position of their leaves. In the Primrose genus the leaves are all radical. This is the case generally in the orders *Droseraceæ*, *Gentianaceæ*, *Lentibulaceæ*, *Plantaginaceæ*, *Plumbaginaceæ*, and in several genera and species of *Compositæ*.

The following orders have opposite and mostly simple leaves, viz., *Labiataæ*, *Verbenaceæ*, *Gentianaceæ*, *Oleaceæ*, *Apocynaceæ*, *Valerianaceæ*, *Dipsaceæ*, *Caprifoliaceæ*, part of *Primulaceæ*, most part of *Lythraceæ*, *Hypericaceæ*, *Elatinaceæ*, *Frankeniaceæ*, *Caryophyllaceæ*, *Cornaceæ*. Sub-order *Stellatæ* and part of *Ericaceæ*, have whorled leaves. The following orders have stipulate leaves, viz., *Polygonaceæ* (occureate or booted), *Amentaceæ*, *Urticaceæ*, *Resedaceæ*, *Euphorbiaceæ*, *Leguminiferæ*, *Rosaceæ*, &c. The following orders contain plants bearing tendrils:—*Cucurbitaceæ*, *Tamaceæ*, *Fumariaceæ*, and *Leguminiferæ*.

Certain orders are distinguished by their prefoliation (state of leaves before expansion). *Filices* and *Droseraceæ* are circinate (curled

inwards from the base like a crook). In *Grossulaceæ* and *Malvaceæ*, the prefoliation is plicate (folded like a fan). In some orders the principal nerves diverge from the base in a radiating manner; for example, *Geraniaceæ*, *Aceraceæ*, *Malvaceæ*, *Grossulaceæ*. In many *Amentiferae*, and in the genus *Ulmus* the lateral nerves are parallel.

Genera are often determinable by the number of leaflets in their compound leaves, as Trefoil, &c., and some by the presence or absence of the odd or terminal leaflet.

ORGANS OF REPRODUCTION.

23. *Inflorescence* is the arrangement of the flowers on the axis. The axis of inflorescence is either *simple* or *branching*, *definite* or *indefinite*. It is *simple* when the flowers are arranged on separate

pedicels, as in the annexed cut, *Berberis vulgaris*.

(Fig. 55.) *a* is the rach or common peduncle, *b* the pedicel (flower-stalk), *c* the flower. In the cut (Fig. 56) the flowers are spiked, and consequently sessile (without pedicels). The rach is the stalk prolonged. *a* the stalk, *b* the fertile spike or catkin, *c* the barren spike or catkin. The axis is compound, i.e. branching, when the lateral flower-stalks bear several flowers, each lateral stalk becoming a secondary axis, and producing flowers and pedicels. The stalk of an individual

flower is usually called the *peduncle*, but in examples of simply clustered flowers (as in Fig. 55), it is more convenient to call the central stalk, which bears only lateral peduncles, and no flowers, except at the very top, the *peduncle* and the lateral flower-stalks *pedicels*. Pedicels and peduncles are terms used in expressing the medium between the flower and the stalk, or branch; but pedicel is always restricted to that part which bears only a single flower; while peduncle is also applied to the part which bears single flowers, though it is also employed to designate the part which bears both pedicels and flowers.

24. The termination of the pedicel, or peduncle, when it bears a single flower, is called the *torus*, or *thalamus*, and when expanded into a broad, flat, elevated, or concave disc, it is called the *receptacle*.



Fig. 55.



Fig. 56.

This part is much developed in the *Compositæ*. In the *Geraniaceæ* it is prolonged beyond the flower, forming a *beak*. In the orders *Araceæ* and *Typhaceæ* it is a club-shaped or a more or less fleshy column. In the Strawberry it is large and succulent. In the *Potentillas* it is dry and conical. Inflorescence is *definite* when the axis ends in a single terminal flower. The inflorescence of all single-flowered plants is definite, as for example the *Tulip*, the *Anemone*, &c. But many plants which produce several flowers are also definite or determinate, as *Ranunculus bulbosus*. (Fig. 57). *a* is the terminal blossom which ends the growth of the central stem, and the lateral flowers *b b* are subsequently expanded. The inflorescence commences at the centre and extends to the circumference; hence it is termed *centrifugal*. The inflorescence is indefinite when it commences at the base, and gradually extends up the stem, and goes on flowering so long as the axis lengthens, which extension of the axis is dependent on the capability of the plant to increase its axis of growth, and is consequently indefinite. This property is very obvious in *Verbena officinalis*. †



Fig. 57.



Fig. 58.

(Fig. 58). At *a* the fruit is formed, at *b* the flowers are expanded, and at *c* they are unexpanded; but they will continue opening as long as the axis continues to grow.

In the *Evening Primrose* and the spiked-flowered *Veronicas* this expansion of the flowers from the base to the apex, in an indefinite manner, is very obvious. This inflorescence is termed *centripetal*.

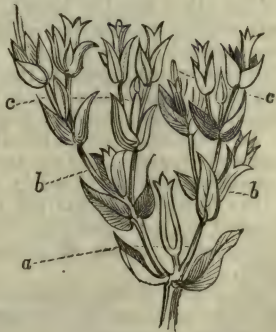


Fig. 59.

One of the commonest forms of the definite or determinate inflorescence is the *Cyme* (Fig. 59) *Erythraea Centaurium*. The stem

terminates in the axillary flower *a*, and gives out a pair of branches under the flower; these branches terminate in axillary flowers *b b*, and give out secondary branches below the respective flowers; these secondary branches again terminate in tertiary axillary florets *c c*. This mode of inflorescence is common in *Caryophyllaceæ*. In some plants, as Privet, for example, the Cymes are arranged in a panicle. The simplest form of the indefinite inflorescence is the spiked or spike-like inflorescence. (See Fig. 58). The cluster or raceme differs from the spike in having the flowers pedicelled, not sessile, as in the spike. (See Fig. 55). The cluster, like the Cyme, is often panicked (branching, every branch forming a lateral axis on which the flowers are



Fig. 60.

and are about equal in length. If these branches divide again, and form similar umbels, the whole is a compound umbel. (See Fig. 60). *i*, bracts of the common involucre; *p*, the point of the very much shortened axis; *b*, the primary branches; *c*, the secondary umbels.

In compound flowers the axis is shortened and expanded, and the inflorescence is a *capitulum* (head). (See Fig. 61).

In *Myosotis palustris* the inflorescence is called *gyrate*. (See Fig. 62).

For other modes of inflorescence, see Index.

25. Organs of Reproduction.—The flower and its appendages are distinguished from the organs of vegetation by their position, structure, and use. They are usually situated on the upper parts of the plant; they are generally of a more delicate structure, remarkable for their elegance, beauty, brilliancy of colour, or exquisiteness of perfume.



Fig. 61.

Their use is to terminate the growth of the plant in the direction where they are situated, and it is by their agency that fruit or seed is produced; and the continuation of the species or race provided for. The flower is composed of the *floral envelopes*, as they are called, and of the *stamens* and *pistils*; the latter are called essential parts of the flower, the former are non-essential parts; and in some species, genera, and orders, some or all the floral envelopes are absent. The stamens and pistils are not always in juxtaposition, but they are always present, either united in the same flower, or distinct and distant from each other on the same plant, or on distinct plants. The floral envelope is usually, but not always double; sometimes there is only a single envelope present. The outer one is called the *calyx*, the inner one the *corolla*.



Fig. 62.

Between the vegetative organs which have been described, and the reproductive organs which are now the subject of description, there is an intermediate system of organs termed *bracts*. These are distinguished from leaves usually by their position (contiguous to the flowers) often by their structure, as membranous or scarious; by their arrangement, which is often symmetrical. In *Malvaceæ*, *Convolvulaceæ*, and in some genera of *Rosaceæ*, the bracts are similar to the calyx, both in arrangement and structure, and are often denominated a secondary calyx, or lower or outer calyx. In *Dipsacæ* and *Compositæ*, they are arranged symmetrically, forming a sort of tiled or overlapping cover to the aggregate flowers. In *Umbellifera*, they are radiate or whorled. They are of great importance in the economy of the *Compositæ*, inasmuch as they converge after the period of flowering, and form a protective cover to the fruit. In many cases they afford distinctive generic and specific characters.

26. *Calyx*.—This organ is usually the outer envelope of the flower, and consists either of a whorl, or series of leaflets (*sepals*), either diverging, or connivent, either horizontal, erect, or reflexed. See Fig. 64; *a* the *calyx*, *b* the *corolla*. When the sepals or leaflets are united, either at their base or throughout, the calyx is usually called *monosepalous* (gamosepalous is a more expressive term; see *Index*.) When the sepals are not united (coherent) the calyx is *polysepalous*. The united portion of the calyx is called the tube, the free, or spreading part, the limb, lobes, segments, or teeth. It is said to be cleft when the incisions are not deep, and parted when they extend nearly to the base. When the adherence is irregular, either in the number of sepals connected, or in the extent of the cohesion, the calyx is irregular, either two-lipped (*labiate*)

(Fig. 65), or *ringent* (gaping). The form of the sepals is various, but commonly elongated, lanceolate, tapering (Fig. 63), either blunt or pointed, and nearly always sessile, *b* the peduncle, *a a a a a* the sepals, or segments of the calyx. They are usually green or some



Fig. 63.



Fig. 64.



Fig. 65.



Fig. 66.

shade of green, but they are occasionally beautifully coloured, as in the *Fuschia*. The calyx, like the sepals, is usually more or less uniform in shape; the usual modifications are the *prismatic*, as in *Primula* (Fig. 67), the *globular*, the *funnel-shaped*, the *turbinate*, like a top, the *inflated* (Fig. 66).

In some families—viz., *Compositæ*, *Umbelliferae*, &c., the calyx is rudimentary, or a small inconspicuous rim or minute teeth. In *Pomaceæ* and *Grossulaceæ*, the calyx adheres to the pistils, and becomes part of the fruit (Apple and Gooseberry). In *Papaveraceæ*, and the greatest part of *Ranunculaceæ*, the calyx is deciduous.



Fig. 67.—*a* the calyx tube; *b* the lobes or teeth of the calyx; *c* the corolla.

27. *The Corolla*.—This organ, the usually more or less coloured inner or upper envelope, or floral verticil, is distinguished by its position, and more obviously by its gay and pleasing colours. If the corolla be of one piece, or if the pieces be all more or less coherent, it is called *monopetalous* (gamopetalous; see index). (See Fig. 68.) When of several pieces it is *polypetalous* (Fig. 69). The individual pieces of which it is composed are called *petals*. See *a a a a a*, Fig. 69.



Fig. 69.—Polypetalous corolla.

The petal often, but not always, consists of two parts—the *claw* (unguis), and the *limb*. Such petals are common in the orders *Cruciferae* and *Caryophyllaceæ* (see Fig. 70); *a* is the claw, *b* the fringed limb. Such petals are called *unguiculate* (clawed). Petals are generally uniform; the rounded, the obcordate, the ovate, and elliptic are the most common forms. Their limb is often notched, cleft, parted,



Fig. 68.—Monopetalous corolla; *a* the calyx; *b* the monopetalous, ovate, or urceolate corolla.

and sometimes fringed. In monopetalous corollas the coherent portion is called the tube, and the free portion the limb, as is the case in the calyx. The monopetalous corolla is regular, when the limb or expanded portion is symmetrical, as in *Campanula* (Fig. 71). It is irregular in *Salvia* (see Fig. 65), *a* the calyx, *b* the corolla, and in the Foxglove (Fig. 72).



Fig. 70.

The polypetalous corolla is regular when the petals are equal, and are arranged symmetrically, as in the *Crowfoot*, the *Rose*, the *Wall-flower*, and



Fig. 71.



Fig. 72.

the *Evening Primrose*, &c. (Fig. 69), is a regular polypetalous corolla. It is irregular when the petals are unequal, or when the arrangement is not symmetrical. The *Sweet Pea* is an example of the latter. In this flower the petals are unequal, and their arrangement is unsymmetrical (see Fig. 73). This form is called the *papilionaceous*, and, like most polypetalous corollas, consists of five petals; the upper is called the *vexillum*, or standard; the two lateral the *wings*; and the two inferior the *keel*; these latter are partially or entirely covered by the wings, and often slightly united. All the leguminiferous plants of Britain are of this form.



Fig. 73.

The accessories or appendages of the petals, are chiefly the nectaries (honey-pores at the base of the limb), in many ranunculaceous plants; and the crown or scales at the base of the limb, or at the top of the claw, in several of the plants composing the Pink family.

28. *Stamens*.—These organs are essential, and their use is to give vitality to the seed. They are composed usually of two parts, the filament and the anther (see Figs. 74, 75).

Stamens are distinguished by their number, by being free or adherent, and by their position. When their number is equal to, or double the number of the petals, they are said to be *definite*. When their number is greater than twice or thrice as many as the petals, they are *indefinite*. They are said to be *free* when not attached to each other, although they are virtually attached when they spring from the inner side of the tube of a mono-

Fig. 74.—*a* the corolla; *b* the stamens.Fig. 75.—*a* the filament; *b* the anther.

petalous corolla, and they are also attached by the calyx when they grow on it; but in both these latter cases they are considered free. They are united when attached to each other at the base only, or by a sort of web-like development, which extends nearly to their upper extremities. The former is the case in *Hypericaceæ*; the latter in *Malvaceæ*, *Geraniaceæ*, and *Leguminiferae*. When they are all united, as in the mallow, they are said to be *monadelphous*; when they form two or several parcels; they are said to be *diadelphous* or *polydelphous*. In determining the classes, orders, &c., of plants, the position of the stamens is of more importance than their number or their connexion. Their position is twofold—first, in relation to the ovary; and second, in relation to the petals or lobes of the corolla.

When situated (placed) on the *torus* (disk of the peduncle, on which is seated the organs of fructification), the insertion of the stamens is

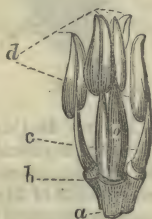


Fig. 76.



Fig. 77.

hypogynous, i.e. under the ovary (see Fig. 76.); a part of the peduncle; b the disk or torus; c the stamens; d the anthers; o the ovary. When they are inserted on the calyx they are said to be *perigynous* (round about the ovary) (see Fig. 77); a the calyx; b the stamens; c the ovary with its carpels.

When the stamens are placed on the ovary, along with the outer floral envelopes, their insertion is *epigynous* (upon the ovary), (Fig. 78); a ovary; b calyx; c corolla; d stamens and anthers; e style and stigma. In relation to the other parts of the flower the stamens are usually placed alternately with the petals, only slightly above them, just as the petals alternate with the sepals, and are slightly above the latter. When the stamens are opposite to the lobes or petals, a row or series of stamens is supposed to be wanting. When the stamens occupy more rows than one, they alternate with each other. Sometimes one of the rows is abortive, as in *Parnassia* and other plants.

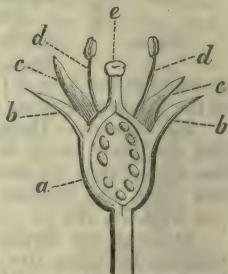


Fig. 78.

29. *The Anther*.—This organ, in its normal or original condition (four-celled), is usually two-celled by the rupture of the horizontal partition. When the vertical partition is ruptured it is one-celled. Its form is various, but usually more or less elliptical or linear, rounded or cordate, often forked at the apex or at the base. It is attached to

the filament either at the base (by basal attachment) (Fig. 79); *a* filament; *b* anther; *c* connective; or it is attached by its base and through its whole extent (Fig. 80). It may be attached by its

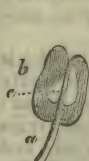


Fig. 79.



Fig. 80.



Fig. 81.



Fig. 82.



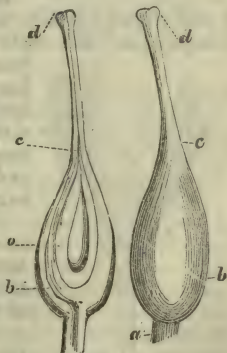
Fig. 83.

centre (versatile attachment), (see Fig. 81); *a*, anthers; *b* filaments. When attached by its apex, the anther is pendulous (Fig. 82); *a*, anther; *b*, filament. Fig. 83 represents the pendulous anther of *Pyrola rotundifolia* opening at the top by pores; *a* anther; *b* pore. The anthers discharge the pollen or fertilizing substance by slits, pores, holes, &c.

30. *The Pollen*, or powdery matter contained in the anther-cells, consists of series of very minute cells contained in each other. The ultimate cell or parent utricle is resolved by division into four parts, each of which forms a granule of pollen. In some plants, *Orchids* for example, the pollen-grains are united into masses by viscid matter; but in general the grains form a powdery substance of exceeding minuteness.

31. *The Pistil*.—This organ occupies the centre of the flower terminating the axis, it being surrounded by the stamens and outer or lower floral envelopes when they are developed. It is the innermost whorl, and is generally considered the female organ of the plant, as the stamens are the male parts, and its destination is to produce fruit or seed. The lower part, when fully developed, becomes the fruit. The Pistil is divided into three parts, the ovary, the style, and the stigma. In the annexed cut (Figs. 84, 85) *a* is the peduncle or carpo-phore; *b* the ovary; *c* the style; and *d* the stigma. In Fig. 84 the pistil is divided longitudinally, in order to show the pendulous ovule *o*, suspended by its funiculus *b*; *c* the connecting channel or style between the stigma *d*, and the ovule *o*.

32. *The Ovary* or germen is composed of a modified leaf, or of several modified leaflets, the mid-rib or mid-ribs forming the style or styles. Hence the ovary is either *simple* or *compound*; it is simple if formed of one leaflet, and it is compound when formed



Figs. 84, 85.

of several. When the ovary is simple it is *one-celled* (unilocular), and when compound it contains *several cells* (pluri- or multilocular). The style is modified by the nature of the ovary. It is simple or single when the ovary is one-celled, and compound when the ovary is pluri- or multilocular. The styles, in the latter case, may be combined or distinct.

33. *The Style* when present (the stigma is sometimes sessile) is usually cylindrical, and traversed by a narrow canal, which is partly filled with elongated cells or tubes, that form the conducting tissue; so called because it is the medium for conveying the pollen-grains to the ovary. The modified leaflet or leaflets are called carpels, and each carpel is usually provided with its own ovary and style. The union of several carpels constitutes a compound pistil. When the style is single, either from originating in a single carpel, or from originating in the combination of several styles of united carpels, it is termed monogynous. When the styles are two, they are digynous, &c.; when numerous or indefinite, polygynous.



Figs. 86, 87.

a the style; b the stigma;
c the calyx.

c cleft-stigma; 3-cleft, as in *Polemonium*; 4-cleft in *Campanula*. The style is sometimes prolonged beyond the stigma, and the projecting part is furnished with collecting hairs (Fig. 89). a style;



Fig. 89.

34. *The Stigma* is the continuation or termination of the style. It contains also the orifice whereby the pollen-grains enter the style, and by which they are conveyed downward to fertilize the ovules in the ovary. Its structure is lax and cellular, and frequently provided with projections or hairs, which collect and retain the pollen-grains that are shed upon it from the anthers (see Figs. 86, 87). The stigma may be simply cleft, as Fig. 88; a style;



Fig. 88.

When no style intervenes between the ovary and stigma, the latter is sessile. This kind of stigma is found in some plants of the Poppy-family, and in several of the *Cruciferae*, &c.

35. *Carpology* treats of the mature pistil, or the nature and various modifications of the fruit, including the *ovule*, the *funiculus*, or *umbilical cord*, the *placentation*, and the forms and divisions of the ovary, on which depend the form and nature of the fruit.

36. The *Ovule* is destined to become the future seed after it has

been fertilized by the pollen. Fig. 90 is a representation of the mature pistil or the ovary advanced to maturity. *a*, the capsule; *b*, the seeds, originally ovules; *c*, the persistent style; *d*, the stigma. The ovules are always contained in ovaries, except in *Coniferæ*, for they do not receive the pollen immediately, but by the intervention of the style and stigma. Direct impregnation only takes place in the orders *Coniferæ* and *Cycadaceæ*.

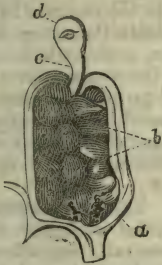


Fig. 90.—Vertical section of *Viola odorata*, with the ovules on the parietal placenta.

pellary leaflets (see Figs. 91, 92).

At the junction of the margins of the carpellary leaflets there is a development of cellular tissue, which constitutes the placenta. This junction of the edges to which the ovules are attached is termed the ventral suture, and the midrib of the carpellary leaflet is the dorsal suture. These

two terms, ventral and dorsal sutures, and ventral and dorsal dehiscence, or opening, are of the highest importance in carpology. The nucleus of the ovule is a series of very minute cells, with a cavity towards its upper extremity, which cavity is destined to receive the pollinary grain, and hence is called the embryo sac. At the apex there is an aperture through all the integuments. *primine*, *secundine*, *tercine*, &c., however many or few there be, This opening is called the foramen. The nucleus and its integuments, as above named, are united at the base of the ovule by a membrane called the chalaza. The point of junction of the ovule with the placenta is the hilum. This part is much developed in seeds of the *Leguminifera*, and in the Horse-chesnut. When the hilum (junction of the ovule with the placenta) and the chalaza (junction of the nucleus of the ovule and its coats), and the foramen (the hole through which the ovule is fertilized), are all in the same plane, or if a straight line will join all three, the ovule is orthotropal. This is the normal state of the ovule, or its position at first. It retains this position in some orders,



Fig. 91.—Horizontal section of the above, showing the placenta, *ppp*, and the sutures, *sss*.



Fig. 92.—*Erythraea Cent.* *a*, carpellary leaflet; *bb*, edges on which the placenta is formed.

as *Polygonaceæ*. When the ovule is so curved on itself as that the foramen approaches the hilum, it is *campylotropal*. When the hilum occupies the place of the foramen, the ovule is *anatropal*, inverted; in this case the foramen points downwards, opposite to the chalaza, but contiguous to the hilum. The position of the ovule in the ovary is various. When the ovary contains only a single ovule, which is attached to the base, the *placentation* is *basal*, and the ovule is erect (*orthotropal*). When inserted above the base on a *parietal* placenta, and when the apex of the ovule is erect, it is termed an *ascending ovule*; when the placentation is parietal, and the apex of the ovule is directed towards the base of the ovary, the ovule is termed *descending*.

There are many other positions of the ovule. These are caused or modified by the length of the umbilical cord, the situations of the placentas, &c. When several ovules are in one cell, they affect the position of each other, change their form, and often produce abortions. For further details of the ovules and their position, consult Carpenter's "Vegetable Physiology," also the Index to this work.

37. *The ovary*, as already stated, is formed by the union of the margins of one or several carpellary leaflets, thus forming a carpel or several carpels, and the fruit is consequently composed of one carpel or of several. The union of the carpels is often so slight that they separate even before the fruit is ripe. This is the case in the Spurge, where the carpels are connected laterally. When the carpels are distinct, as in *Ranunculus*, the fruit is termed *apocarpous*. (See Fig. 93.) *a*, the aggregate but distinct carpels; *b*, a single carpel magnified.



Fig. 93.

Syncarpous fruits consist of several carpels, as Apple, Bellflower, &c. The seed vessel, or ripened ovary, is either fleshy, as Apple, Cherry, &c.; or juicy, as the currant; or more or less herbaceous, membranous, or searious, as the *Pea*, *Stock*, *Pink*, *Pimpernel*, &c.; in the latter cases, it is usually called a *capsule*. It consists of the *endocarp*, or internal lining; the *mesocarp*, usually more or less cellular, very much developed in the *pomaceous* fruits, and the *epicarp*, or the external pellicle (epidermis). These different parts of the pericarp are only evidently developed in fruits which are more or less fleshy, as Pear, Sweet pea, and such like. The *pericarp* is either one-celled or many-celled. The 1-celled pericarp is formed by the junction of the opposite edges of one carpellary leaflet; the 2-, 3-, 4-, or more-celled pericarp, by the junction of 2, 3, 4, or several leaflets. If there be two carpellary leaflets, with their margins meeting in the centre, the pericarp is 2-celled; if 3 carpellary leaflets form the pericarp, or ovary, the pericarp is 3-celled, and so on. The partitions thus produced are called *dissepiments*. When the carpels unite regularly in the centre, each carpel becomes a distinct cell; but the

distinctness of cells frequently disappears, owing to the rupture of the dissepiments. And a central placentation and one-celled pericarp are not unfrequent where the normal number of cells is five, but where the partitions disappear during the progress of the pericarp to maturity. In *Caryophyllaceæ*, the placentation is not produced on the accrescent margins of the carpellary leaflets, but on a prolongation of the central axis of the flower. This placentation is found also in *Primulaceæ*, *Santalaceæ*, &c. Marginal or carpellary placentation, however, is the rule, and central or axile the exception.

38. *Dehiscence and nondehiscence* (opening and not opening) of pericarps. *Dehiscent* pericarps are of several kinds.

1st. Such as open by the ventral suture only—as *Columbine*, *Marsh Marigold*, &c.

2nd. By both ventral and dorsal sutures—as *Pea*, &c.

3rd. By two valves united when entire by a sort of frame (*replum*). This form of pericarp is usually termed a silique, or pod, and opens from the base upwards, (Fig. 94.) *a*, valves; *b*, frame; *c*, seeds. The silicule, or pouch, is a shortened or modified form of the silique. (See Fig. 95.)

4th. Opening by a lid—*Pimpernel*.

5th. By valves, slits, or pores—*Bellflower*, *Snapdragon*, *Poppy*, &c.

6th. Opening by separation of carpels—*Spurge*.

Indehiscent pericarps contain one seed, or more than one, and are either fleshy or dry. Apple, Medlar, Gooseberry, are examples of these pericarps. The Cherry, Acorn, also the fruit of Maple, Goosefoot, Dandelion, Grass, &c., illustrate these indehiscent, one-



Fig. 94.

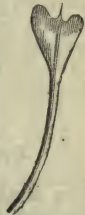


Fig. 95.

seeded pericarps. In some of these the seed is loose; in others, it is closely invested by the pericarp.

39. *The Seed* consists of the seminal coats (formed of or by the union of the *primine*, *secundine*, &c., of the ovule), and the *embryo*, which is usually accompanied with the *albumen* (perisperm), a mass of cellular tissue, sometimes mealy, as in *Wheat*, *Rye*, and other cereals; and sometimes fleshy, as *Cocoa-nut*. Sometimes the embryo contains all the albumen of the seed, as in *Pea* and other *Leguminiferous* plants.

40. *The Embryo* consists of rudimentary leaves, a rudimentary stem and rootlet, or radicle. The first of these is called the *cotyledons*, the second the *plumule*, and the third the *radicle*. The reproductive bodies of cryptogams have no cotyledons, nor plumule, nor radicle; hence these plants are called *acotyledonous*. The next grand division of plants, *Endogens*, bear perfect seeds, which have one cotyledon, or seed-leaf, or alternate cotyledons; hence these are termed *monocotyledonous* plants.

Exogens produce seeds which germinate with two cotyledons; hence these plants are called *dicotyledonous* plants. (Fig. 96.)

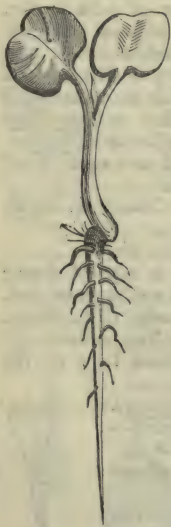


Fig. 96.

41. *Application of the floral organs to the determination of divisions, classes, orders, and genera.* All plants may be arranged under one or other of the two primary grand divisions of *flowerless* and *flowering* plants (cryptogamous plants, *plantæ cryptogamæ*, and phanerogamous plants, *plantæ phanerogamæ*). The former grand division is characterised by the *absence* of floral envelopes; they want stamens and pistils, and their reproductive bodies are different from true seeds in structure. The lower orders of flowerless plants have a centre of vegetation, and increase in all directions round it; the higher orders of the same grand division have stems only in the highest orders, and these stems or fronds (leaves) rather increase by additions to their apex, than to both diameter and apex, as is the case in the flowering orders. Again, there is nothing in the flowerless orders analogous to stamens and pistils, and they have scarcely anything analogous to sepals and petals. Their spores or reproductive bodies are capable of reproducing individuals like those on which they were themselves produced; but here their analogy with true seeds ceases. Their organiza-

tion is not even so complicated as is that of buds; they differ but slightly from the plant on which they grow. They are without cotyledons, plumule, and radicle, albumen and integuments. The whole spore is equally capable of germination, and consequently germination may take place at any part of it. They are acotyledonous, because their reproductive bodies (spores) are of uniform structure and consistence.

It has been already stated, that the flowering plants are subdivided into two sub-divisions by the structure and position of their vegetative organs; it now can be shown that these grand divisions are characterised by their seeds and by their floral envelopes. The seed of an endogenous plant (first sub-division) has its embryo concealed in a sheath at the period of germination; it also germinates with one cotyledon (seed-leaf), or with alternate cotyledons, not with opposite cotyledons, as is the case in exogenous plants. In the former, *Endogens*, the floral envelope is mostly single, and the floral and fruit-organs are mostly three, or a multiple of three, except in cases of suppression, when one third or two thirds are to be subtracted, or in cases of redundancy, where one-third or two-thirds are to be added to the normal numbers, three, six, nine, &c. The second sub-division is also characterised by all these marks, which differ from the distinctive cha-

acters of Monocotyledons. The seed germinates with two lobes: hence the term Dicotyledons. The floral envelopes are usually double, and the number of organs in the flower, &c., is five, or a multiple of five, or a suppression of one-fifth, or two-fifths, or an addition of one-fifth, or two-fifths, &c. For example, the normal number of sepals, petals, stamens, carpellary leaflets, is five, or twice five, or five with one-fifth, or two-fifths subtracted, or with one-fifth or two-fifths added.

42. *Relation of the Ovary to the Calyx*.—In distinguishing classes or secondary sub-divisions, the relation of the ovary to the calyx affords very important characters. First, the ovary may be quite free, or it may be attached or adherent to the calyx. This mark separates the orders *Hydrocharidaceæ*, *Orchidaceæ*, *Amaryllidaceæ*, *Iridaceæ*, and *Dioscoreaceæ*, from all the other monocotyledonous orders. In the dicotyledonous orders it serves to distinguish some of the apetalous and monochlamydeous orders, from other orders which are without a perianth, or have only a single perianth. It is of equal importance in subdividing the polypetalous and monopetalous orders. The insertion of the stamens is of similar importance. Many orders are characterised by having the stamens situated under the ovary (hypogynous insertion). The perigynous stamens (stamens produced on the calyx) characterise another large group. When the ovary is adherent, the stamens are always epigynous; and when the stamens are hypogynous, the ovary is always free. A few orders—viz., *Fumariaceæ*, *Malvaceæ*, *Geraniaceæ*, *Hypericaceæ*, and *Leguminiferæ*, are distinguished by the union of the stamens in one, two, or three parcels. The stigma is cleft and feathery in *Gramineæ*, cleft in *Compositæ*, 4-cleft in *Campanulaceæ*, sessile in *Papaveraceæ*, and very short or sessile in *Cruciferaæ*. The corolla is not a very constant organ; it is absent in certain genera and species of some very extensive orders—for example, *Ranunculaceæ* and *Cruciferaæ*, rarely in *Caryophyllaceæ*; also, in *Rosaceæ*, *Saxifragaceæ*, *Primulaceæ*. The irregular labiate corolla is characteristic of most of the order *Labiataæ*; and there is usually more or less irregularity in the corollas of *Scrophulariaceæ* and *Lentibulaceæ*. All the British examples of *Leguminiferæ* have irregular papilionaceous corollas; and several genera of *Ranunculaceæ*, and the orders *Fumariaceæ* and *Polygalaceæ*, have the corolla irregular. The persistency or caducity of the calyx is a very constant character. It is caducous (speedily falls off) in most genera of *Ranunculaceæ*, in *Papaveraceæ*, and *Cruciferaæ*. It is persistent in *Cistaceæ*, *Violaceæ*, *Caryophyllaceæ*, *Geraniaceæ*, *Malvaceæ*, *Hypericaceæ*, *Leguminiferæ*, *Rosaceæ*, and in all monopetalous orders. It is rudimentary, or reduced to a mere rim, in *Valerianaceæ*, *Umbelliferæ*, and *Compositæ*. A few orders are distinguished by their mode of inflorescence—for example, *Araceæ* and *Typhaceæ* by their spicate inflorescence; *Dipsaceæ* by their capitate flowers; *Compositæ* by their compound flowers on a common receptacle; *Umbelliferæ* by their umbellate flowers.

PHYSIOLOGY.

FLOWERING AND DURATION OF PLANTS.

Vitality—General or Abstract idea of Life.—By life is meant the entire series of the activities of all the organs which exist in animals and plants, with their resulting phenomena. Vital power is the distinctive quality or peculiarity of appropriating simple chemical substances, and of applying them to the production of other substances, such as cannot be produced by any mere mechanical power, nor by any human process whatsoever. The primary development of the simple cell, whether animal or vegetable, is the primary manifestation of the presence of vital power and vital action. This primary cell is formed by the absorption and assimilation of new matter; and by the continuous absorption of nutritive matter from without, this primary vesicle is capable of increase; i.e. it has the power of growth. All bodies thus produced by vital agency are limited both in space and duration. A crystal which increases mechanically by successive deposits may go on enlarging itself as long as the material capable of crystallisation is supplied. There is no limit to its extent, nor to its duration: it is limited only by the supply of the fluid matter in which it is developed. When a plant or an animal, on the other hand, has reached in magnitude and duration, to a certain extent, the vital action or power of increase ceases, and the body previously endued with vitality or animation begins to decay, and is decomposed into a new series of chemical combinations. The periods assigned for the duration of living beings is very unequal, some existing only a few hours; some, as trees, prolonging their existence for hundreds, and some for thousands of years. The power of life is limited to the assimilation of materials from which it produces organic forms: it has no creative power. None of the substances found in plants are produced in them; they are all derived from without, and by the power of vitality caused to assume certain new forms and combinations. There are some obvious, prominent laws which regulate the formation of inorganised and organised bodies. Crystals, for example, are developed with flat surfaces, and are bounded by straight lines, and with either right, or obtuse, or acute angles. Plants and animals have their surfaces bounded by round or rounded lines. The cylindrical or spherical form, or some of the almost infinite modifications of this form, are generally prevalent in both the vegetable and animal kingdom. Another characteristic feature of living bodies is derangement of vital functions, consequent decay, death, and finally dissolution. Inorganised matter is not subject to any similar periodic changes. Mechanical and chemical changes do take place in these, but they are not periodic, neither diurnal nor annual, but are as lasting as their

causes. In organised objects there is a power which counteracts the continuous effects of chemical, mechanical, or other stimulating causes; and this power is called vitality.

Vegetable Physiology, or the doctrine of the life of the whole plant, and of its particular organs, treats of the general phenomena of vegetation, of the mechanism in a state of action, of the vital principles of both simple and compound organs of the vital stimulants to germination, of maturation, decay, and death, together with nutrition or the food of plants, their productive functions, and periodicity. The simple but exquisite organs of plants would be incapable of exercising their functions, if they were not endued with certain properties which are generally termed vital properties. These are elasticity, extensibility, and contractibility (irritability of some authors), and permeability, which render them susceptible of being acted on by vital stimulants. These qualities are eminently resident in the cellular tissue, and are manifested by the celerity wherewith injured parts of plants are healed, especially if the injury has been inflicted while the plant is in a condition of vigorous growth. In the lowest orders of vegetables—Fungi, for example—the plant may be cut in two parts; and if access of the air be prevented by bringing the sections into contact, they will speedily coalesce. Any plant may be lopped, pruned, or partly destroyed, still the portion attached to the ground lives, and under certain circumstances the lopped portions will produce new plants. The presence of vital activity in the cellular tissues is also proved by grafting. The graft or slip is always (in whatever way the operation may be performed) so placed that the bark of the slip may coincide with the bark of the stock. The slip is so inserted into the cleft of the stock as that the portions of bark on each side of the cleft may exactly correspond with the small portion of bark on the outer side of the slip. When this is nicely effected, and the admission of air prevented by compost and bandaging, the cohesion of the slip and stock is speedily effected; and this union commences in the cellular tissues of the bark. Slips are also rooted in sand, with or without artificial heat and shade, and the rootlets are protruded from the cellular tissue of the bark. The buds and seeds are also mostly cellular, covered by their epidermis or tunics (coats) respectively. But notwithstanding the intense nature of the vital power and the qualities of the tissues whereby the vital principle is capable of acting and of being acted on, there will be no vital action on the simple organs without the aid of what are called vital stimulants. These are heat, moisture, air, and light. Moisture is absolutely necessary to the germination of seeds, which will never grow, unless placed where there is somewhat more moisture than is contained in them. The tissue being extensible, expands or elongates, and thus the cell or cells acquire more space, and are consequently capable of imbibing more moisture, and also of allowing the viscid matter wherewith the cell is lined to expand, and so fill up the vacuum caused by the extension of the cell-walls. The effect of heat on the cell and its contents is an expansion, both of the external walls, the internal linings,

and the fluid granular matter which the cell contains. The extensibility of the cell is thus alternately in a state of action and reaction; for when the temperature from any cause whatever is lowered, the contractible quality of the cell is exerted, and forces the fluid contents, which are not compressible, through the cell walls, which are permeable, into other contiguous cells. By means of the two stimulants, moisture and heat, acting upon the elastic wall of the cell, producing regular expansions and contractions of its dimensions, the sap of the cells is forced through the walls, either filling up, or forming new cells. It has been already stated that the cells are the primary formations; and in the infancy of every plant the central cellular tissue or pith performs a very important part in the development of the future individual. The rootlets, which are only a continuation of the plumule (primary or elementary stem) suck up moisture (water) with whatever else may be held by it in solution; and this in the first instance is merely the chemical constituents of the seed, or such of them as are capable of solution in water. With this sap new cells are produced by the formative power of the plant, new matter is derived from the soil or atmosphere, and enlargement and development are the results.

At this early period the medullary rays play a very active part both in forming compartments wherein the vascular bundles or woody tissues are subsequently produced, as well as in laying the foundation of the future bark. At this early stage of development the vital energy is confined to the centre, or is resident in the pith; until the stem is formed, or in the course of formation, the vital action is limited to the central part, which subsequently, when the sap can be conveyed by other means, decays or disappears. Subsequently the inner bark and the external and recently-formed woody layers are the principal means of conveying nutriment to all parts of the plant, or the medium of inter-communion between the root and the leaves. During the extension of the stem in an erect or upward direction, the root is extending itself in an opposite quarter, developing branches and fibrils. Each of the latter ends in a very cellular substance called the spongiole or spongelet, which imbibes water and its contents from the surrounding soil. It is as yet undecided whether this apparatus which imbibes, and is the only part of the root capable of imbibition, be like the suctorial apparatus of animals, which latter acts by withdrawing the air from the lungs, and thus producing a vacuum, the fluid in contact with the sucking medium naturally flowing onwards to restore the equilibrium; or whether the act of sucking in the plant be not mechanical or capillary, like the absorbency of sponges, candle-wicks, &c.

It is ascertained that the fluid nourishment of the plant enters by the very ends of the rootlets, and that it is conveyed primarily by the pith or central part of the vegetable, and subsequently by other channels, and chiefly through those of the bark and cambium into all parts of the plant which are in a state of growth. In trees, after the lapse of a very few years, the pith becomes dry, and conse-

quently transmits the sap no longer. In old trees it is contracted, & the woody, contiguous parts are compressed by the external layers, and finally the medullary sheath is entirely filled up with wood, and the pith consequently disappears. The central wood, if not dead, is quite incapable of transmitting fluids. The ascent of the sap and air (circulation as it used to be termed) is accomplished by means of the recently-formed bark and wood. In old hollow trees we have a proof that the centre of the tree is not necessary to its remaining in vigorous growth. Some of the oldest Yews have existed probably thousands of years, and during a large portion of this long period have been reduced to a few inches of wood surrounding and partly inclosing the space which the wood of the tree at some remote period entirely filled. These trees are as healthy externally, and the process of vegetation goes on as steadily, as if the tree were only a few hundred years of age. The sap flows on in its thin rind,—for it is little more than a bark-like rind or shell,—and the top shows no symptom of decay; even the topmost twig is invigorated by the sap, and performs its functions in the economy of the tree. It is not improbable that the death or decay of the central parts of trees does really promote their healthy and prolonged existence, for the sap will flow more readily, and yield more nutriment when it is confined within narrower limits than the extent of the whole diameter of the trunk. It is not improbable that the longevity of the Oak, and other trees of long duration, is owing to the hardening of the central wood, *duramen*; so that this centre is no longer capable of taking any part in the vital processes of the tree. The Yew certainly corroborates this view; for it is by far the most durable of living beings, except perhaps the Monkey-bread-tree of Central and Southern Africa; having in many instances existed since the very beginning of the creation, and being so often found reduced to a mere shell or part of a shell, yet without manifesting the slightest symptoms of decay in its uppermost twigs, where the decay of all trees first discovers itself. In suitable soil, if preserved from atmospheric influences, such as storms and casualties, fires, and other mechanical injuries, Yew-trees would be almost, if not quite perennial, and endure as long as the chalky hills and combs in which they delight to grow. As collateral support of the same view, it may be stated as a well-known fact, that trees of rapid growth and little density speedily decay; as, for example, Poplars, Willows, Mountain ash, &c. Even the centre in these trees is never so dense as to prevent the passage of liquid or gaseous matters; *duramen*, or hard wood, is never formed in them, and the presence of sap, in every part, contributes doubtless to the speedy decay of these soft-wooded and fast-growing trees.

Circulation of Sap.—Little is with certainty known about the circulation of sap. It is known that the circulation in plants, as it is called, is totally dissimilar to the circulation of the blood in animals. There can be no real circulation in plants; for the fluid enters by the root or lower end, and passes off by the leaves; the upper extremities leaving behind only the condensed or solid mate-

rials, which have been, by the vital power of the plant, extracted from the water, and either assimilated to and made part of the plant's substance, or secreted and laid up in peculiar reservoirs for other subsequent operations. There is a greater similarity between the conducting tissues in plants, and the alimentary canal in animals, than there is between the circulating fluid (blood) of the latter, and the ascent and distribution of sap in vegetables. But analogies between bodies so differently constituted have more of fancy than of reality in their origin. Every part of an animal is endued with vitality. In plants (trees), the larger portion of their interior may be dead or absent, and the remaining external parts perform all the functions of an entirely perfect being. No animal can exist under such circumstances. The grand channels for the circulation of animal fluids is near the centre of their bodies. In plants the sap is conveyed at or near the exterior parts of their substance. In plants the organs of exhalation are simple and external; the corresponding organs of respiration in animals are of a more complex character, and are internal. Plants are far more tenacious of life than animals are, and are generally of much longer duration, and can bear greater alternations of temperature. Sap is certainly conveyed by the cellular tissues so long as they are in a vital condition; and hence cellular tissues in a state of vital action must be present in some part or other of every living plant. The cells secrete as well as convey. It is supposed that the spirals (tracheæ) convey air as the cells convey sap, and hence the name *tracheæ* (wind-pipe). But doubtless every tissue, whether spiral or *vasiform*, contains something, either air or sap, or some air and some sap. It is certain that nature abhors a vacuum; and every vessel, whether cellular or vascular, if it be in a living condition, must be filled with something, and that something must be fluid, either aqueous or gaseous; for it is universally admitted that the plant cannot imbibe nutriment except in this form. Hence there is another distinction between the two kingdoms of organized beings, derived from the nature of their nourishing *media* respectively. Animals feed on organized matter, and are capable of receiving it into their bodies either in a solid or fluid condition. Plants are supported on inorganised matter solely, and they imbibe this matter in a fluid condition, either in an aerial or liquid state.

Nutrition of Plants.—It has been already stated that the plant is composed of certain proportions of cellular tissue, vascular tissue, and woody fibres, and that while in a living state all these tissues are filled with fluids of an aqueous or gaseous nature. An analysis of the contents of the cells, &c., will show that the plant contains some solid substances, such as starch, leaf-green, resins, &c., and partly a watery solution containing sugar, gum, acids, albumen, and in several plants essential oils. None of the chemical substances found in plants exist naturally in the soil from which plants derive their constituents. The earth yields no starch nor albumen, nor essential oil, nor gum, nor sugar. It does not even contain, in an uncombined condition, any carbon, or hydrogen, or any oxygen or nitrogen,

or any sulphur or sulphates. Yet it is by a combination of two or more of these simple substances that the organic constituents of all plants are formed. Before any substance can be absorbed by the spongelets, and hence enter into the cellular and vascular tissues of the plant, such substance must exist in a liquid or gaseous form. Carbon, one of the primary constituents of all plants, is insoluble in water; but it exists abundantly in a gaseous state as carbonic acid gas; and in this condition it is absorbable by plants, and chiefly by the roots or spongelets. The decomposition of vegetables, or of vegetable substances, supply carbon in this state to the soil and to the growing plants. Oxygen and hydrogen are absorbed through the medium of water, of which these are the two chief chemical constituents. The nitrogen in combination with hydrogen forms ammonia, and in this gaseous state it is absorbed by the roots of plants. Sulphur, which exists in a smaller proportion in plants than any of the above mentioned constituents, is absorbed in combination with oxygen in the form of sulphuric acid.

These nutritious media, as above stated, produce, by assimilation and elimination, the numerous chemical substances found in plants; for example, carbon, hydrogen, oxygen, nitrogen, and sulphur, combined in certain definite proportions, form *albumen*, *fibrine*, and *caseine*. Carbon, hydrogen, oxygen and nitrogen, in certain specific combinations, form what is termed the *organic bases*. Carbon, hydrogen, and oxygen, form *vegetable acids*, *woody fibre*, *starch*, *gum*, *mucilage*, *sugar*, *fats*, *leaf or sap-green*, *resin*, *colouring substances*. Carbon and hydrogen form *volatile oils*. The above-named materials, obtainable from plants by chemical analyses, are all combustible. The under-mentioned are the results of combustion, viz.—*carbonic acid*, *silicic acid* (silica), *phosphoric acid*, *sulphuric acid*, *nitric acid*; also the following metallic oxides—*soda*, *potassa*, *lime*, *magnesia*, *oxide of iron*, &c., &c. All these are incombustible. It may be easily inferred from experience, that all plants do not contain the same constituents in equal proportions; but a certain amount is necessarily present in every plant. Every order, genus, or species of plants, has a distinct and individual power of assimilating such portions or proportions of the nourishing materials supplied to it, and of eliminating or rejecting the rest. Thus in the *Labiatae* we find much essential or volatile oil, in the *Coniferae* resinous matters, in the *Leguminiferae* sulphur and gum, in the *Gramineae* starch and silica. This property is called *assimilation*. Carbon, as has been shown, cannot be absorbed either in a solid or liquid form, consequently it is only absorbable when it forms the compound, carbonic acid (carbon and oxygen). Although it is one of the chief nutritious constituents of plants, it cannot enter into the composition of cells, &c., till it has been set free from the presence of oxygen, and thereby acquires a capacity to assume a solid consistence. This property of freeing from other materials, condensation, &c., is termed *assimilation*, and is occasioned by an effect of one of the other active stimulants, viz., light. When the external parts of plants, viz., the young shoots and leaves, are exposed to this

stimulus, they become green, and the surrounding atmosphere rapidly absorbs the oxygen, while the carbon remains fixed, or solidified; this is called the fixation of carbon. Hydrogen is absorbed in water, a combination of hydrogen with oxygen. In this case part of the water only is exhaled, and part of it is assimilated, or enters into the composition of the plant, from which it becomes inseparable, except by the destruction of the vegetable tissues. Nitrogen is combined with hydrogen, and forms ammonia in the soil, and in this compound state it enters into combination with the plants growing in that soil, though in a smaller proportion than the above-described nutritious media. Sulphur enters the plant as sulphuric acid, and when freed from the acid is the principal constituent in albumen, fibrine, and caseine.

The minerals, or incombustible constituents of plants, are combinations of alkalis and alkaline earths, as soda, potassa, lime, &c., with acids. These constitute but a small proportion of the weight of plants. They are all received into the plant through the medium of its roots. The proportions in which they occur are very various; for example, the stems of certain plants, as Wheat and other cereals and Grasses, also the stems of *Equiseta* (Horse-tail); contain much silica. Pea-haulm contains much lime; wheat-straw very little, but wheat-grains very much in proportion to their other constituents.

5. *Functions of the Compound Organs.*—It has been shown that plants absorb their aliment chiefly from the soil; they are supposed also to derive a portion of it from the atmosphere. There certainly exists in the leaves a medium of communication between the external air and the internal, or simple organs of plants, and there is no question about the respiration and exhalation of plants, as carried on through the stomata. But it is not so certain that plants, by their leaves or other green parts, inhale atmospheric air, or any air. They appear to inhale dew; for wilted or partially shrunken plants speedily revive and become plump when exposed to moderate rain or heavy dew. The property of the root is to absorb nutriment from the earth; the property of the stem is to communicate part of this nutriment to the leaves, part being retained for its own growth. The leaves supply the means of carrying off the superfluous air and water from the sap; or they are the media of respiration and exhalation. It is not supposed that leaves are in any respect analogous to the pulmonary apparatus in animals. Air may escape from plants through any portion of their surface, either from the stem or leaves; and of course it may also obtain ingress from the atmosphere through the same channels. Air will always, through some means or other, be of the same density or specific gravity at equal distances from the earth's surface. If the internal air (that which appears to be pent up in plants) is through compression of the cell-walls, or tissues, rendered denser, it will force its way into either newly-formed cells, or into the atmosphere. If, on the other hand, the air in plants is more rarified (less dense) than the external air, the latter will, by ingress, restore the equilibrium. The tissues being elastic (extensible and contractible) will be subject to the alternations of temperature.

When the contents, as well as the walls of the cells, expand by an increase of heat, the tendency of the air will be to expand and to escape, either into recently-formed adjacent cells, or into the atmosphere; it will permeate the cell-wall more easily than it will enlarge it. When, on the contrary, the cells and their contents are contracted by a decrease of temperature, the air from without may enter to restore the equilibrium. It is probable, however, that the equilibrium, disturbed by rapid growth or distension of the cells, is restored from within rather than from without. It is usually stated, that the leaves inhale carbonic acid gas, and exhale oxygen gas. It is difficult to conceive that so simple an apparatus as leaves can perform an operation of such nicety as the inhalation of one portion (a very minute one, too,) of atmospheric air, and the rejection or non-inhalation of the rest (the greater part), with which the carbonic acid is so intimately blended. Even the respiratory organs of animals cannot eliminate the pure air from what is noxious. That the leaves exhale and inhale water there can be no reasonable doubt. But every green or recent portion of the plant performs this; otherwise leafless plants could not have this property. The solid materials of plants imbibed by the roots are dissolved in a quantity of water larger than the plant can assimilate; and this superfluous water is in all probability evaporated by the stomata on the under surface of the leaves, and also by the stomata which are in the bark of the green or recent parts of the plant. But as the tissues which contain the aqueous solutions are elastic, changes of temperature will affect the liquid in the same way in which the gaseous contents are affected; when the cells are compressed the sap will flow into other newly-formed cells, or reach the surface, whether green or not green, and be carried off into the atmosphere by evaporation. The oldest trees, if the vital functions be carried on at all, have most of the vital energy resident near the surface; and the old bark, when much fissured, as in old Elms, Oaks, and Firs, permits evaporation at these fissures; and where the bark is not in this state, but entire, as in the Beech, &c., it is very porous. The ascent and descent of the sap, if there be indeed any such periodic motions, is a subject of much obscurity. It is well known that at certain periods, as in the beginning of Spring and at the latter end of Summer, there is probably a greater absorption by the roots, and, consequently, a larger quantity of sap in the plant or tree. But the vessels that are in a state of activity or vitality are always full of sap or air. In Spring, or very early in Summer, when the buds and leaf-branches are developed, a larger measure of fluid materials is absorbed, in order to supply sap for the newly-formed vessels.

Periodicity.—In many, probably in all plants, there may be observed certain changes which are ascribed to the combined influence of light and temperature, or to one or other of these agents. What has been fancifully termed the sleep of plants appears to be owing to one or both of these causes. In the after part of the day Leguminiferous plants close their leaves,—that is, the leaflets approach each other, as

if for mutual protection. This phenomenon is observable in the Trefoils, and in other trifoliate plants; the two lateral or basal leaflets approach face to face, and the terminal one is applied to the edges of the lower ones. Certain blossoms unfold their petals in the morning, and shut them up before noon, as the *Goat's-beard*, and some other compound flowers. Others, as the *Evening Primrose*, open their showy flowers about sun-setting. Some, as the *Poor Man's Weather-glass*, *Chickweed*, and many plants of the Caryophyllaceous order, expand their little blossoms when the atmosphere is dry; and in consequence a fine day is anticipated, when these plants open even to a cloudy or perhaps mizzling sky. These facts prove that certain species have idiosyncracies or characters peculiar to themselves. The decrease of heat acts upon the tissues of Trefoil, and of many other plants, and the effect of this action is as above stated, the converging of the leaves. The same causes accelerate the opening of the *Evening Primrose*. Some plants, as the *Dandelion*, open when the air is moist, as it usually is in the morning; the *Pimpernel* closes when moisture is present in the atmosphere. The same atmospheric causes produce contrary effects on different objects. Diurnal changes appear in some plants, which are always affected by the rotation of day and night. In other plants there may be a change, though it is not so manifest in the external organs as it is in those of the plants above-mentioned. But there are other and more important periodic changes in the condition of all plants. The duration of plants is very variable. Some species of annual plants, if the period of flowering be retarded, may endure two or more years. Some plants, usually deemed annuals, do not, under ordinary circumstances, require more than a few months to come to maturity, and ripen seed. Some of the *Chickweed* and *Speedwell* species ripen seeds in the space of six or eight weeks after the plants begin to germinate; so that the same plant may have (in the course of a spring, summer, and autumn) a progeny two or three times removed from the primary parent. In herbaceous perennial plants, or such as can prolong their existence for several years without the intervention of seeds, the whole vitality of the plant is lodged in the root, and the future herbaceous stem grows from a bud which was previously formed near the crown of the root. From this bud the stem of next year is developed.

The true distinction, between what are called annual plants or biennial plants and perennials, is, that the latter flower oftener than once from the same root. The former, whether they flower the first, the second, or the third year after the germination of their seeds, only flower once. The *American Aloe* only flowers once, though it lives many years before it is in a condition to shoot up a flower-stalk.

Duration of Flowers.—Some blossoms last only a few hours, as several of the *Poppies*. Some last a day, as the *Evening Primrose*. Some endure for weeks, especially in the spring, when the weather is usually cold and moist. The *Primrose* is in many seasons a flowering plant for three or four months. In gardens, the *Polyanthus*—a variety of the *Primrose*—generally accompanies the *Snowdrop*, the

Crocus, the *Daffodil*, the *Crown Imperial*, and all the early and late spring flowers.

Annual Periodic Changes.—The most important periodic changes of plants next to their germination, maturity, decay, and death, are the generally annual phenomena of leafing and flowering. Some of the lower orders of plants germinate, bear flowers, and die in short periods, and certain plants produce seeds in a few weeks; but the great bulk of plants only leaf and flower once a year, and are regulated partly by laws peculiar to themselves, and partly by the temperature, &c. All perennial plants, whether herbaceous or ligneous, have a period of cessation from growth. During this dormant state, the vitality of herbaceous plants is resident in the root or in the stem, if the plant be bulbous, like the *Onion*, or tuberous like the *Potato*. In the British and European forest and other trees, during at least six months in the year, there is no apparent growth; leaves, young branches, and shoots are not produced. Some trees are clothed with leaves at an earlier period of the spring or summer than others are—for example, the *Horse Chestnut*, though an exotic, is in full leaf at least ten days earlier than the *Oak*. The *Hawthorn* is in leaf before the *Blackthorn* is, though the latter blossoms two or three weeks earlier than the former. Several of the *Willows* exhibit their golden catkins long ere their leaves appear. Some of the same tribe bear both leaves and blossoms at the same time. The *Mezereon shrub* flowers in March; but its leaves do not appear for several weeks after the flowers. Most of our common fruit-trees expand their blossoms just before their leaves, as the *Pear* and *Apple*, or they unfold both leaves and flowers together, as the *Cherry*.

Some shrubs and trees retain the greater portion of their leaves longer than one year, and hence are called *Evergreens*. These latter produce new leaves every season, but only a portion of the then existing leaves fall off, and, consequently, they are always leafy. The permanence of leaves, either for a few months or for a few years, must be mainly owing to the state of the sap in the tree. We know that in most trees, when the sap is less abundant in the extremities of a tree, where leaves only are produced, the leaves begin to turn pale, or become of some hue very different from green, and subsequently fall off. Such trees are called deciduous, and this period of leaf-falling is termed *the fall of the leaf*. When the sap abounds in the leaf-stalk, and at the junction of the leaf and the stem or branch, the leaf is not easily detached. When, on the other hand, the sap is evaporated, or condensed, the leaf falls off by its own weight, or by the agitation of the tree. Deficiency of sap is the cause of the fall of the leaf. Is sap more abundant in Evergreens, or is the longer permanency of their leaves due to the structure of the leaf? Do Evergreens abound more in sap at all periods than deciduous trees? After an herbaceous plant has done flowering, and before its stem entirely decays, a bud is formed at its root, in which all the vitality of the plant resides during its dormant state. Before the leaves begin to decay, and some considerable time before they fall off, buds

are formed in their axils (angles which they make with the stem or branch), and these buds remain unexpanded, but in a vital state, till next season. Though provision is thus made, both in roots and leaf-buds, in both herbaceous and ligneous plants, for the continuation of the growth or of the existence of the species, neither can be accomplished without some increase of temperature. This is shown by the fact that the Oak, which in early seasons expands its leaves in the first week of May, in other backward seasons is not in full leaf before midsummer. (See Table of leafing of trees and shrubs.) This is also proved by the leafing of all trees about a week earlier in England than in Scotland. If the Oak were removed to the extreme north of Europe, it would not expand its leaves at all, and, consequently, would soon perish. The only ligneous vegetation of Lapland is the low creeping dwarf Birch, and two or three Willows. Elevation of temperature is the great accelerating cause of vegetation; where moisture is abundant, either in the tree or in the soil, heat is one of the most important stimulants of growth. The precise manner of its action upon the vital organs may be unknown, but its effects are unquestionable. The general effect of heat on all substances, except such as are of an argillaceous nature, is to cause them to expand or to occupy a larger space. The alternation of temperature is probably the cause of the periodic diurnal phenomena in plants, viz., the folding of the leaves of certain genera and species in the latter part of the day, also the expansion of certain blossoms early in the morning, towards mid-day, and towards the evening, or during the night. These diurnal phenomena may also partly depend on the agency of light, which is a well-ascertained stimulant in the vegetable kingdom. The effect of light, as one of the efficient causes of producing or contributing to the production of the annual phenomena of vegetation, is smaller than that of heat in causing the expansion of leaves; but in the periods of leafing and flowering, both are active and powerful stimulants. An increase of temperature causes the vessels and their contents to swell, and, besides this, it dissolves the gummy or viscid substances which retain the scales of the bud in a cohesive state. Thus it both relaxes the external envelopes and enlarges or swells the interior rudimentary organs. The effect of general mechanical laws upon all sorts of beings, whether organized or inorganized, can be stated; but the effect of another and different principle, called vitality, which probably modifies the action of the former, cannot be stated in definite terms.

It is known that vitality is a modifying power, principle, or great cause; for otherwise, if the same stimulating forces continued to act, the effects would be continuous, which is not the case either in the vegetable or in the animal kingdoms. Heat, or any other merely mechanical cause, constantly acting on inorganized matter, would be productive of similar effects as long as the cause continued in operation. But in plants this is not the case. Light, moisture, and heat are operative causes of phenomena in vegetables; but though they may continue long, after definite results are produced, they are inoperative

on such plants as have already produced these results. Most of our hardy bulbous plants flower early, long before the heat has reached its maximum. Yet this agent, active though it be, and necessary as it is, exerts no influence on such plants as have completed the period either of their existence or of their activity. In the former case they are totally extinct, being resolved into their original chemical constituents; in the latter, they resemble a *caput mortuum*, without any visible signs of vitality till they have had a period of repose, when they again resume their active functions, under the stimulus of heat, moisture, and light. The cause of these periodic returns of activity and repose, both in animals and in plants, will probably remain for ever among the arcana or mysteries of science. The periods of the flowering of the most common genera, and species of plants, in the south of England (between lat. 50 and 52) are as follow:—

PERIODS OF FLOWERING OF PLANTS—DURATION OF PLANTS—PROPER TIME OF COLLECTING PLANTS BOTH FOR EXAMINATION AND FOR THE HERBARIUM.

44. GRAMINEÆ.—In the south of England the grasses begin to flower in May; during the first week of this month the *Annual Poa* (*Poa annua*) and the sweet-scented *Vernal grass* (*Anthoxanthum odoratum*) may be looked for. In early seasons these have been seen in flower as early as the middle of April, and even in March. In registers of bygone years these two, with *Alopecurus pratensis* (Foxtail meadow grass) are entered as early as the 20th of March. Most of the grasses flower in June, and only a few, viz.—the *Reed grasses* (*Arundo*, *Calamagrostis*), the *Bents*, *Agrostis*, *Triticum*, *Elymus*, &c., flower in July and August. In the descriptive portion of this work, the earliest period is stated (when known), as also the latest date when the species in question has been gathered in flower, or perhaps in fruit. And it may be stated, once for all, that in general these dates are taken from registers which extend from the Spring of 1829 to the present date, viz.—the Summer and Autumn of 1853, a period of 25 years.

45. CYPERACEÆ.—The *Carex hirta* (rough Carex) *Carex præcox* (early Carex) flower between the middle of April and the first week of May. The two river *Carices* (*C. riparia* and *paludosa*) have also been seen in flower at the same date; but the month of May is the usual flowering month of this extensive genus, and most of them are to be found in June in a better state for comparison and preservation than at an earlier date, because they are generally in fruit at this latter period. The *Cotton grasses* (*Eriophora*) flower in May and June, and the *Club-rushes* (*Scirpi*) in June, July, and August; the *Eleocharis palustris* sometimes in May. The *Cyperis* flower in August and September.

46. The aquatic, or paludal orders, POTAMACEÆ (Pond-weeds), LEMNACEÆ (Duck-weeds), TYPHACEÆ (Reed-mace, &c.), JUNCAGINACEÆ, BUTOMACEÆ and ALISMACEÆ (Water Plantains, &c.), do not flower

till about midsummer, and many of the species of these orders are not in flower before August. *Zannichellia* has been noticed in flower in May, and *Butomus umbellatus* (Flowering rush) and *Potamogeton crispus* before the middle of June. The *Spotted-leaved Arum* (*Arum maculatum*) is usually in flower about the 1st of May, and not seldom by the middle of April.

47. JUNCACEÆ.—The earliest flowering species of the Rush order are *Luzula campestris* and *L. pilosus*. These are found, the former, in dry pastures, and the latter in woods, as early as the latter end of March and the beginning of April. The 13th of March is the earliest date in the registers above-mentioned for *L. pilosus*; *L. campestris* appears in flower about the same time. The great body of the rushes flowers between June and the beginning of August, most of them in July. *Juncus obtusiflorus* may be found in September in full flower. The pretty *Bog Asphodel* flowers about midsummer.

48. LILIACEÆ.—The beautiful species comprehended in the order of Liliaceous plants commence flowering in April, and some of them are in flower in August. They are, however, most plentiful in the earlier months. The *Chequered Daffodil* and the *Wild Tulip* are the earliest of the order; both of these very interesting species are found about the end of April or the beginning of May. The Tulip is the earlier of the two, but seldom flowers, while the latter is a free flowerer. The *Star of Bethlehem* flowers about the first week in May, and the sylvan *Blue Bell* about the last week in April. The *Ramson* (*Allium ursinum*) flowers in May or in the beginning of June, the *A. vineale* (Crow Garlic) about a month later. The remaining species of this genus flower between midsummer and August. The pretty and rare *Grape Hyacinth* (*Muscari racemosum*) and *Gagea lutea* are much earlier, the former appearing in May, the latter in April and March.

The curious, showy *Meadow Saffron* (*Colchicum autumnale*), the sole representative of the order COLCHICACEÆ in Britain, displays its naked flowers in September, or even later: it is, however, often to be met with in meadows in the West of England in August; the leaves appear the following spring.

49. ASPARAGACEÆ.—The *Convallarias*, viz., *Solomon's Seal*, the *Lily of the Valley*, *Wild Asparagus*, and the *Two-leaved Convallaria* (*Maianthemum bifolium*), all flower in May or early in June. The *Butcher's Broom* flowers in March and April. The 14th of March is about the earliest date in floral registers for the first appearance of this plant in flower. The *Lily of the Valley* has been collected in full bloom on the 29th April; its usual time of flowering in ordinary seasons is from the 12th to the end of May.

The *Snow-drop* and the *Common Daffodil* are almost the only species of the gorgeous order *Amaryllidaceæ* that we can with propriety call our own native plants, and they may be only naturalised. In gardens and sheltered orchards the *Snowdrop* appears at the beginning of February or earlier; but in woods, banks, and meadows where it grows—and it grows in such places abundantly—it is seldom in flower before March. Its flowering period fluctuates from the

middle of January to the beginning of March. The *Daffodil* flowers from the 9th March to about Lady-day, the 25th. The *Summer Snowflake* flowers about the beginning or middle of June. The *Yellow Iris* or *Flag* is rarely in flower before the end of May, and the *Frog-bit* and *Water Aloe*, and *Gladwyn Iris*, not much before the middle of July.

50. ORCHIDACEÆ. The *Orchids* of this country do not begin to flower before April. The *Wood Orchis* (*O. mascula*) appears between the middle of April and the beginning of May, being usually in flower with the Cowslip, and the *Green meadow Orchis* (*O. morio*) does not linger long behind it (the Cowslip). The *Spider Orchis* (*Ophrys aranifera*) flowers in April and in the beginning of May, and the *Fly Orchis* (*O. muscifera*) towards the end of May or beginning of June.

In June it is rather late to look for the two *brown spotted Orchises* in flower, viz., the *Dwarf* and the *Great spotted Orchises* (*O. ustulata* and *O. fusca*). They generally flower about the end of May, or in late seasons early in June. The great *Butterfly Orchis* flowers at the same date as the two just mentioned. The *Bee*, the *broad-leaved Marsh*, and the *Spotted-leaved Orchis* will, in the South of England, be found in full flower some time in June, early or late in the month, dependent, of course, on the season. The *broad-leaved Twayblade* (*Listera ovata*) and the *White Helleborines* (*Cephalanthera grandiflora* and *ensifolia*) usually appear in May or the beginning of June. *Lady's Tresses* and the *Marsh Green Orchis* (*Malaxis paludosa*) flower in August and September.

51. In general, the native British timber-trees are all early flowerers. The amentiferous or catkin bearing-trees, such as the *Alder*, the *Hazel*, the *Poplar*, produce their male flowers before winter, and their female flowers early in spring, when the male catkins expand and shed their fertilizing powder on the fruit-bearing organs. These trees are either all males and all females, as the Willows, Poplars, &c., or have male flowers on one part of the plant and the female flowers on another part, either distant or more or less contiguous, as the *Chestnut*, *Beech*, the *Alder*, the *Hazel*, some of the *Willows*, and the *Yew*. The *Hazel* has been noticed with open catkins and the red, hairy stigmas of the ovary as early as the 22nd of February; and the Willow, vulgarly called *Palm* (*Salix aurita*), and the *Yew*, on the 8th of March. The *Beech*, the *Oak*, and the *Hornbeam* flower in April and May. The *Poplars* in March and April. The *Pine* in May. Most of the *Willows* in April and May, though some are as early as March, and a few delay till June.

The *Elms* bear flowers in March or April, shedding their immature fruit soon after. These trees increase by the roots, and rarely bring seeds to perfection.

The two common *Nettles* and *Wall Pellitory* are in flower from Midsummer to September or October.

52. EUPHORBIACEÆ.—The Spurge and other kindred plants of this order vary much in their periods of flowering. For example, the *Wood Spurge* (*E. amygdaloides*) flowers about the beginning of April

(per reg. 4th, 7th, 16th). The common Spurge (*E. Helioscopia*) from the beginning of June to the end of summer. The other two common species—viz., *E. Peplus* and *E. exigua* are somewhat later in beginning to flower, and continue flowering nearly as long as the common *Sun Spurge*. The rarer *Spurges* have generally a shorter period for flowering—viz., from May to August, but several, as the *E. Paralias*, *E. Portlandica*, and *E. Lathyris* remain in flower till September. The pretty shrub *Box* flowers in April, the *Dog Mercury* in April (from 25th March to the 20th April). The Annual Mercury commences flowering in May, and continues till the winter's frosts nip both blossoms and plants. The *Crowberry* (*Empetrum*) flowers in the earlier part of summer, and in autumn the fruit affords sustenance for the moor game (grouse) of the north of England and Scotland, where this shrub abounds. The rare *Asarum* (*Asarabacca*) flowers in May, and the rarer *Aristolœchia* (*Birchwort*) flowers in July and August. It seldom or never produces fruit in this country. The next three orders SANTALACEÆ, THYMELEACEÆ, and ELEAGNACEÆ are represented in this country by only four plants, all more or less ligneous. The *Toad-flax* (*Thesium*) flowers about Midsummer, the two *Daphnes*—viz., the *Spurge Laurel* and *Mezercon* flower early, the latter about the middle of March, the former a little earlier (16th March, 7th ditto). The *Buckthorn* flowers in May.

53. POLYGONACEÆ. The plants of this order are all late flowerers, except the *Common Sorrel* and the *Sheep's-Sorrel*, which flower in May; all the other species, both of *Dock* (*Rumex*) or *Snake-weed* (*Polygonum*), flower after midsummer, the majority of the latter genus flowering in August and September. The *Goose-foot* order, CHENOPODIACEÆ, is also an order of late-flowering plants, rather later than those of the preceding order.

54. LABIATÆ. Some one or other of the plants of this order may be seen in flower during the whole year. If the winter has been mild—or, rather, if the months of December and January have not been severe—the *Lamium album* and *L. purpureum* (the white and red Deadnettles) will be in blossom during the first, second, and all the succeeding months of the year. The white Deadnettle has been observed in flower on the 15th—30th of January, and the red Deadnettle on the 29th of the same month. Their true period of flowering, however, is not so early; but the flowers of the previous year may generally be found on plants growing in sheltered spots at the very beginning of the year, unless the weather has been very inclement. In March the *L. purpureum* covers rich rubbish-heaps with its reddish stems and leaves, for they have this hue in the earlier part of the season. The 16th March, and from this date to the end of the month, is the period when these two hardy plants blossom; and their period of full flowering is not later than April in this part of England. Several species of *Lamium*, viz., *L. amplexicaule*, *L. incisum*, and, perhaps, *L. purpureum*, bear fruit, although their corollas have never expanded, or even reached the upper limb of the calyx. They are actually in fruit before the expansion of their

flowers. In cold, wet seasons, the flowers of *L. amplexicaule* are never fully developed, yet the plant produces seed. The *Yellow Deadnettle* (*L. Galeobdolon*) does not flower till May: the 25th of April is the earliest registered date. The *Ajuga reptans* (wood or wild Bugle) will be found in flower at the same period. The *Yellow Bugle* (*A. phamæpitys*) is occasionally seen in blossom as early as May. The fine plant, *Salvia verbenaca*, is also an early flowerer: its period is May, or the beginning of June. The period when the *Ground ivy* (*Glechoma hed.*) first shows its blossoms fluctuates with the weather; the 4th, 5th, and 15th of March are the earliest periods noted. Its usual time of flowering is at the middle and latter end of March. All the other Labiate plants, as the *Thyme*, the *Wound worts* (*Stachys*)—of these last mentioned *S. sylvatica* is the earliest—the *Wood-sage*, *Marjoram*, *Mint*, &c., do not flower till after midsummer, and some of them are as late as September, while several of the mints do not flower at all in the northern parts of the kingdom.

55. SCROPHULARIACEÆ. As in the preceding orders so also in this, several individual plants are always in flower. The annual *Speedwells* (*Veronica agrestis* *V. polita* and *V. hederifolia*) are found flowering as late as December, and begin to flower in mild winters in the first and second months of the year. *V. agrestis*, 28th January, 9th February, 12th, 16th, and 20th March; *V. hederifolia* a little later; *V. arvensis* is early if in flower much before April, the 4th of March is the earliest date at which this plant has been noticed in flower. *Paul's Betony* (*V. serpyllifolia*) flowers about the same period. The pretty *Bird's-eye* (*V. phamædrys*) is about a month later. The following are a few of the dates of its first appearance in flower, 4th, 5th, 26th, and 29th of April. Its usual period is from the middle of April to the beginning of May. The earliest *Water-speedwell* is the *Common Brooklime* (*V. Beccabunga*), which flowers in early seasons from the 14th to the end of May. The remaining *Veronicas*, except the rare *V. verna* and *triphyllos*, and most of the plants in all the other genera of this order, do not flower before June. The *Ivy-leaved Toad-flax* (*Linaria Cymbalaria*) may be looked for on old walls about the beginning of April. It has been seen in flower as early as the 4th. It is the only species of the genus which flowers before June. *Pedicularis sylvatica* has been gathered in flower as early as the 1st of May, and the *Yellow rattle* (*Rhinanthus crista-galli*) on the 15th. The rare *Vernal Figwort*, and the *Forglome*, are the only other species of the order in flower before Midsummer, and the latter is usually after this period. The remaining plants of this order flower in the end of June, in July, and in August; the great *Snapdragon*, and some of the *Linarias*, continue flowering through September.

56. The *Broom-rapes* and the *Mulleins* are all late flowerers, none being seen in this state before Midsummer, except *Orobanche rapum*, *O. majus* and *O. elatior*. *O. minus* always appears soon after the hay is mown on the uplands. The *Mulleins* (*Verbasca*) are not in flower before July or August. The comparatively rare *Henbane*

usually flowers in May. The *Nightshades*, both the deadly and woody, in June, towards the middle or end of the month. The *Woody Nightshade* (*Solan. dulc.*) has been seen in flower on the 2nd of June, but the season then was unusually early. The *Black Nightshade* is found, both in flower and fruit, as late as October.

57. BORAGINACEÆ. *Myosotis arvensis* (intermedia). One of the *Mouse-ears* has been observed in flower about the beginning of May: the dates are, 29th April, 3d and 12th May. *M. collina* and *M. versicolor* are, at least, a fortnight—or, perhaps, three weeks—earlier. *Myosotis palustris* (Forget-me-not) has been gathered in flower on the 27th May. The *Pulmonarias* are early flowerers, but they are very rarely seen, except in gardens or collections. The *Gromwells*, *Comfrey*, *Hound's-tongue*, both species, and the *Viper's Bugloss*, flower in May; but they may all be found in flower in the beginning of June, unless the season be unusually early. With the exception of the genus *Myosotis*, which flowers both early and late in the season, none of the species of this order are late flowerers.

58. CONVULVULACEÆ and CUSCUTACEÆ. In early seasons the *Field Convolvulus* flowers in June, rarely so early as the 15th. The large *White Convolvulus* ornaments the hedges from the 10th of July to the end of September. The *Less Dodder* appears on heathy, furzy commons, twining about Ling, Pettywhin, Gorse, &c., about the same time. The *Great Dodder* appears in August. The *Gentianas*, and other plants belonging to the order *Gentianaceæ*, except the *Bog-bean*, are all late in flowering; the *Bog-bean* should be looked for, at latest, before the end of May. The 27th of May is the date when it was first noticed in a very cold, backward season. The *Villarsia nymphæ*; and the *Centaureas* appear in flower about midsummer, or soon after. The *Vernal Gentian* alone flowers in April: the remainder of this order in August and September. Both species of *Periwinkles* are early flowerers. *Vinca minor* has been seen in flower as early as the 7th March, and *V. major* as early as the 23d February. Of course, like all early flowerers, they continue a long time in blossom.

The *Privet*, *Ash*, and *Holly*, flower in June.

59. ERICACEÆ. Most of the *Heaths*, *Bilberries*, *Winter's-greens*, and allied genera, commence flowering in June—a few in May. *Erica cinerea* has been noticed in a sheltered spot, with a southern aspect, in flower on the 28th May; but midsummer is the usual period of its flowering. The *Cross-leaved Heath* and the *Common Ling* appear in flower somewhat later. The rarer species of the order are not in flower before July, except one of the *Pyrolas*, and one of the *Heaths* peculiar to Ireland.

60. PRIMULACEÆ. Certain species of this order are in flower very early; some are late, and continue flowering from the latter end of summer to the commencement of severe weather. The dates of the first appearance of the *Primrose* in flower fluctuate between the beginning of February and the middle of March, viz., 29th January, 12th, 13th February, 7th, 13th, 14th March. The *Cowslip* is several

weeks later; its dates vary from the 8th March to the 8th April. It should be borne in mind that these species, and several others which flower at these early periods, are not in full blossom for some time after these specified dates. After their first appearance in flower, they will generally be from ten to twenty days, according to the mildness or severity of the weather, before they ornament the woods, hedges, and meadows with their fully-developed beauties. The same influences which accelerate or delay the fulness of blossoms, have a tendency to hasten or retard their decay. With a clear atmosphere and high temperature they speedily decay, while their duration is protracted by cool, moist, or cloudy weather. The Primroses peculiar to Yorkshire and Scotland are not in flower till June and July. The *Water Milfoil* (*Hottonia*) may be found flowering in May, but it will not be too late to look for it from the beginning to the middle of June. The *Lysimachias* (Loosestrife), except *L. nemorum*, which flowers in May or the first week of June, the *Pimpernels*, *Brookweed*, &c., are all late flowerers, and some of them are found in flower as late as October. The blue *Pimpernel*, in mild seasons, produces flowers in November.

61. PLANTAGINACEÆ. *Ribwort* (Plan[^], lanceolata) occasionally flowers about the middle of April. Its usual period is the latter end of April and the beginning of May (April 27). *Plantago* ~~foronopus~~ *perfoliatus* has been collected in flower the first week of May (the 5th). *P. major* and *P. media* are a week or so later.

62. PLUMBAGINACEÆ. The *Thrift* flowers about midsummer, or soon after: the *Sea Lavenders* rarely before July.

The *Common Butterwort* (*Pinguicula vulg.*) flowers in May: the rarer Alpine species are about a month later. The *Utricularias* flower from midsummer to August.

63. COMPOSITÆ. Some one or other of the species composing this large order is always in flower. For example, the *Common Groundsel* (*Senecio vulgaris*) flowers early in the spring (12th—17th February), and continues in flower till the sharp frosts and biting dry winds of winter nip its more delicate parts. When the winters are rather mild, or not severe, the flowers of autumn exist through the winter and early spring. And this is the case not only with the flowers of the Groundsel, but also with those of the common annual Veronicas, the Henbit, Deadnettle, &c. All these plants produce their flowers every month in the year—or, at least, retain them. One of the earliest flowerers of this order is the *Dandelion*, which begins to flower between the 15th February and the 1st April. But the flowers first seen are, probably, the production of the previous season. It continues to flower from March to November, a period of not less than nine months. These two plants, viz., Groundsel and Dandelion, with the *Common Daisy*, are the only early flowers to be seen among the common species of this order, and these three remain in flower during the whole year. There are other two early-flowering rather common plants, viz., the *Coltsfoot* and the *Butter-bur*. The dates of the former are between the 14th and 29th March; the latter is a

week or two later. Both these plants are remarkable for flowering a few weeks before the appearance of their leaves. *Cineraria campensis* flowers in the latter part of May and beginning of June: a rare plant. The Common Mouse-ear Hawkweed begins to flower from the 5th to the 23d May. These are all the early-flowering common plants of this order. The great body of them does not flower much before July, and from that period to September. *Hieracium boreale* and *H. umbellatum* do not flower till the end of August. Both species of *Bidens*, viz., *B. tripartita* and *B. cernua*, also *Hemp Agrimony*, *Pulicaria vulgaris*, several of the *Wormwoods* and *Ragweeds*, are often as late as the beginning of September before they flower. The *Goat's-beard*, the large *Ox-eye Daisy*, and the *Corn Chamomile* generally flower before or about midsummer. In the month of August the greatest number of species will be found in flower.

64. CAMPANULACEÆ. Of this order *Prismatocarpus* and *Jasione* rarely flower in May, but usually before or about Midsummer. Most of the *Campanulas* will be found in flower during the month of July: they go off rather suddenly. Several of them, as *C. Trachelium* and *C. glomerata*, remain in flower till September; but, as above stated, July and the beginning of August is the period when they are all in flower. The *Rampions* (*Phyteuma*) flower at the same time as the *Campanulas*. Plants of the *Teasel* and *Scabious* kinds are generally in flower in the month of July, but they keep in flower during August. *Scabiosa succisa* is seldom in flower before August, and it continues to flower all the next month.

65. VALERIANACEÆ. The common *Fedias*, or *Valerianellas* (Lamb's Lettuce) flower in March and April; *V. olitoria* between 7th March and 23d April; *V. dioica* about the 20th May; *V. officinalis* the 29th May, rarely before June, usually near midsummer.

66. RUBIACEÆ. The dates of some plants of this family are as follow:—*Sherardia arvensis*, April 2nd; very early. *Asperula odorata*, 28th May. *Galium Aparine*, 8th May. *Galium* *mol.* 18th May. *G. cruciatum*, 2nd June. *G. saxatile*, 10th June. About the end of June and the whole of July is the season for all but the very latest of these plants. The *Marsh Cross-worts* are a fortnight later than the preceding.

67. The shrubby, or arborescent orders, LONICERÆ, CORNACEÆ, ARALIACEÆ, and LORANTHACEÆ, include plants that flower almost in every one of the four seasons. For example, the *Ivy* flowers at the beginning of winter, viz., in October and November, remaining in flower till the spring, when it produces fruit. The *Mistletoe* flowers in March and April, and has ripe fruit, as is well known, in winter. The *Honeysuckles* flower in May and June. The *Elderberry-tree* and the *Guelder-rose trees* flower about the same time, and their fruit is perfect in September and October.

68. UMBELLIFERÆ. The earliest flowering common plant of this order is *Anthriscus vulgaris* (Hare's Parsley), which begins to blossom about the middle of April, but is frequently later: and is not perhaps generally in flower before the latter end of the month, or about the

beginning of May. *Anthriscus sylvestris* may be looked for about the same time, or two or three days later. *Pignut* (Bunium), *Venus' Comb* (Scandix), *Cow Parsnep* (Heracleum), *Sanicle* (Sanicula), usually begin to flower in May. The Pig-nut has been seen as early as the 12th; the others rarely before the beginning of June or end of May. In June most of the early-flowering umbelliferous plants may be collected, both in flower and fruit (the latter is more important for identifying the genus than the former). The remaining common species will not be generally found in a state fit for examination before July. A few delay flowering till August, as some of the *Water Parsneps*; all these late-flowering species will be found in September.

69. SAXIFRAGACEÆ.—The *Golden Saxifrage* (*Chrysosplenium oppositifolium*) is the earliest flowering plant of this family. It has been noticed as early as the beginning of March in forward seasons. The 9th and 15th March, and from the latter date to the beginning of April, is the time to look for this early plant; but it may be found during several months, for it continues flowering till late in the summer. The rarer *Ch. alternifolium* is rather later, and does not remain so long in flower. *Saxifraga tridactylites* flowers in March and April, and *S. granulata* always in April, in this latitude usually about the middle of April. The remaining species of this large genus flower in May and June, the *S. oppositifolia* in April, and a very few are not usually in flower till August.

70. The *Currant* and *Gooseberry* shrubs are all early flowerers, never later than April; their dates are from 29th March to the 20th April. From the 10th to the middle of April is the time when they usually flower.

71. Of the order CRASSULACEÆ there is only one plant, *Sedum acre*, common in this country, and it usually flowers in June. *White Bryony* (*Bryonia dioica*), one of our largest climbers, generally flowers in May. The 6th of this month is the earliest registered date of its appearance, and it is sometimes as late as the end of the month. The 30th is also noted as the day of its first appearance. The *Black Bryony* (*Tamus com.*) begins to flower at the same time.

72. *Montia fontana* (Water Blinks), and *Callitriche* (Water Star-wort), flower in May, the former about the middle of April (11th, 17th), and the latter at the end of the month, 30th. The *Water Hornwort* (*Ceratophyllum*), and the *Water Milfoil* (*Myriophyllum*), seldom are found in fruit. They flower about the end of June, or later.

73. ONAGRACEÆ.—These plants are in perfection about the end of June and in July. *Epilobium parviflorum* has been noticed in blossom on the 3rd June. *E. montanum* appears about the 18th, and by mid-summer all the species are in flower. July is the time to collect them for the herbarium, or for examination. At this time they are in perfection.

74. ROSACEÆ AND POMACEÆ.—The *Barren Strawberry* has been seen in flower in February (the 23rd). March is the usual month when it may be expected. The *Black Thorn* rarely flowers before the middle

of April. It has been seen as early as the 8th of March, but this is quite unusual. Its registered periods are the 7th, 8th, 9th, 20th, 23rd, and 26th of April. The *Cherry* and the *Common Pear* are only a few days or a week later in their appearance. They may all be found in blossom at the same time. The *Apple-tree* is in blossom in the last week of April, or the first week in May in early seasons. The dates are 26th April, the 1st and the 4th of May. In late seasons it is not in flower before the middle of May. The *Rowan Tree*, *Whitethorn*, *beam* and *Service trees* are a week or two later than the *Apple-tree*. The following dates are registered for the flowering of the May (common Hawthorn, *Cratægus Oxy.*), April 24th, the 1st, 9th, 10th, 15th, 16th, and 21st of May—a variation of nearly a month. *Common Avena* (*Geum urbanum*), 4th May; *Common Cinquefoil* (*Potentilla reptans*), 14th; and *Tormentil* (*P. Tormentilla*), the 12th and 18th; *Silver Weed* (*P. Anserina*), 30th of the same month. These are the earliest dates, and they continue in flower for weeks (months?). The *Strawberry* flowers in May, earlier or later, according to the season. Of the *Brambles*, the *Raspberry* and the *Dewberry* have been noticed in flower before Midsummer; in early seasons before the end of May. *R. corylifolius* is registered on the 2nd June. The *Dog Rose* has been gathered on the 21st May; the *R. Arvensis* about the 18th June; and the *Sweetbrier* on the 5th. *R. spinosissima* is generally in fruit about the end of May. The *Roses* and *Brambles* may, however, be found in flower during the months of June and July with this difference, that the *Roses* almost all vanish in July, while most of the *Brambles* remain in flower during the next month (August).

75. LEGUMINIFERÆ.—The *Common Gorse* (*Ulex europæus*) is sometimes in flower all the winter, for the second crop of flowers lasts till next spring. The *Dwarf Furze* (*Ulex nanus*) flowers very late, October and November. Where it grows with the larger species or variety, as it does abundantly on Wandsworth and Clapham Commons, the time of flowering is a very obvious distinctive mark between the two plants. The dwarf species is covered with blossoms, as above, while not a single flower adorns the common and larger form. With these exceptions, none of the plants of this order are early flowerers. The *Wood Vetch* (*Orobanchus tuberosus*) has been noticed in flower as early as the 17th April, and at various dates intermediate between that just stated and the beginning of May. The *Vetches* or *Tares* (*V. sativa* and *sepi.*) flower in May (15th and 28th), the large *Blue climbing Vetch* about the middle of August; the *Lotus corn.* or *Birdsfoot*, about the end of May (23rd); the *Horse-shoe Vetch* (*Hippocrepis com.*) 5th and 19th May; the *Lathyrus prat.* (Meadow Vetchling) about the middle of June (12th); the *Golden Broom* (*Sarothamnus scoparius*) about the 1st of May; and the *Petty Whip* (*Genista anglica*) about a fortnight earlier. The *Meadow Trefoil* flowers in May (1st and 15th), and the *White Clover* (*A. repens*) about the same time (13th), but much later in moist places, where it is frequently found. Most plants in this order flower about, or soon

moist trifolium

after, midsummer; only a few flower towards the end of July. Most of them, however, perhaps all, except the very earliest, will be found in good condition for examination during July.

76. GERANIACEÆ.—The *Geraniums* commence flowering in April, viz., *E. icterium* (Storks-bill), and *G. Molle* (Dove's-foot Crane's-bill), from the 6th to the 21st April, though the latter is often as late as the beginning of May ere it shows flowers. *Herb Robert* (*G. robertianum*) begins to flower at the beginning of May (1st, 3rd, and 10th). *G. lucidum* appears about the same time. The rest flower in June, but they all remain in flower for some months.

77. The beautiful *Oxalis Acetosella* (Wood Sorrel) may often be found in the same places as the *Wood Anemone*, and it flowers about the same time, or rather earlier. Its dates are 29th March, 1st, 6th, 7th, and 11th of April. The *Wood Violet* (*V. sylvatica*) is later—viz., the 13th, 20th, and 25th of April are some of its dates. In gardens and sheltered places (where the Sweet Violet only is found), *V. odorata* flowers in the beginning of March, and even in February, in mild seasons (22nd and 23rd February). The two species of *Buckthorn* and the *Spindle Tree* (*Euonymus europ.*), 12th and 26th May. The latter from the 12th to the 26th May; the two former between the middle of May and the beginning of June. The *Wild Maple* (*Acer campestre*) about the 8th of May, or later; and the *Sycamore* (*A. Pseudo-platanus*) about the same period. The common Lime is seldom in flower before July. The *St. John's Worts* (*Hyperica*) are July-flowerers. *H. pulchrum* and *H. humifusum* are the earliest in blossom; the latter has been gathered in flower on the 12th June.

78. *Malva rotundifolia* is the earliest flowering plant of the Malvaceous order. It begins about the end of May (28th), and flowers till September; *M. sylvestris* is about a fortnight later (13th June); and does not continue in flower quite so long. The *Musk Mallow* (*M. moschata*) flowers in July. The *Marsh Mallow* (*Althæa* of) does not flower till August. The *Milkwort* (*Polygala vulgaris*) commences flowering about the second week of May (12th), and continues in flower all the summer. The *Droseras* flower about midsummer, or the beginning of July.

79. CRUCIFERÆ.—The *Shepherd's-purse* (*Capsella*) is in flower most of the year. It is one of the earliest, as it is one of the latest, flowering plants. It is, however, later in beginning to flower than the Groundsel. It may be looked for in the second week of March, and may be often seen flowering in February (21st February, 10th and 13th March). The *Vernal Whitlow-grass* (*Draba Verna*) will generally be found about the same time; but the flowers of the latter are of short duration, rarely existing till the 1st of May. In January, 1853, the *Wall Whitlow-grass* was noticed in several places about Twickenham in flower at the very beginning of the month (the 3rd), along with *Arenaria serpyllifolia* and *Common Groundsel*: but there was at that time and place no Shepherd's-purse in flower. The November of the preceding year, 1852, had been remarkably mild (six degrees and a-half above the average temperature of many pre-

vious years), and December about nine degrees milder than any December during the last eighty years. The *Wallflower* blossoms, in early seasons, about the middle of March (10th, 15th, 25th March, and 2nd of April). It blossoms with the *Cuckoo-flowers* (*Cardamine prat.* and *hirsuta*). The latter, or rather *C. sylvatica*, has been gathered in February (20th); and the beginning of its flowering is noted on the 24th, 25th, and 28th of March. The *Meadow Cuckoo-flower* is about a month later—viz., at the end of March, and first week of April (30th March and 10th April). *C. amara* (Bitter Lady's Frock) is several weeks later. Johnson, the editor of "Gerarde's Herbal," noticed the flowering of these plants in the following terms:—"These flowre for the most part in Aprill and May, when the cuckoo begins to sing her pleasant notes without stammering." They are rather before the cuckoo's notes in the south of England. *Jack-by-the-hedge* is always in flower in April, or early in May. Its dates are April 7th, 21st, and 28th; and its white blossoms are very conspicuous about the end of April and the beginning of May. May and June are the chief months for the blossoming of the *Crucifer*, only a few delay flowering till July and August; but several continue in blossom till September, or even later.

80. The *Resedas* and *Cistuses* flower in May and June; *R. lutea* about the middle, and *R. luteola* about the end of the month. Both the latter and *Helianthemum vulgare* have been seen as early in flower as the 27th May.

81. The *Fumarias* flower in May and June, and last in flower all the summer.

Corydalis flaviculata has been gathered in flower on the 8th May; and *Fumaria* of. (?) as early as the 20th of April. *aphaca* The Poppies begin to flower in May. *P. Argemone* has been noticed in flower on the 13th; the greater *Celandine* has been first seen in flower on the 21st and 28th April, and on the 1st and 6th of May. These plants are in flower in June and part of July.

82. CARYOPHYLLACEÆ.—*Common Chickweed* (*Stellaria media*) is in flower nearly all the year. In mild winters it appears in January. The following are the dates of its first appearance:—28th January, 14th, 15th, 25th February, and 28th March. *Stellaria Holostea* (Stitchwort) begins to flower about the last week of April, 24th, 28th, April, and 6th and 11th May; *S. graminea* on the 18th May, and *S. uliginosa* about the same time. *S. glauca* is rare, and seldom found in flower till after midsummer. *Cerastium glom.* and *C. triviale* are usually in flower about the end of March and beginning of April. (20th March, 2nd, 5th, and 9th April). The *Arenarias*, viz., *A. trinervis*, *A. rubra*, and *A. serpyllifolia*, do not usually flower before May. In early seasons the first-mentioned may be seen in flower from the 10th to the 20th of April; *A. rubra* the 13th May, and *A. serpyllifolia* about the 15th of the same month. The *Red Lychnis* (*Melandrium diurnum*), appears in flower occasionally as early as the beginning of May. It has been gathered in full flower on the 26th April, and it is rarely so late as the latter end of May.

+ *M. Flos-cuculi*, or Meadow Pink, is about a week later, viz., from the 8th to the 20th May. This is the real cuckoo flower. When this plant begins to blossom the cuckoo does sing his pleasant notes without stammering. Both these plants remain in flower all through the summer. The *White Campion* (*M. vesperinum*) is later than either of these. Its flowering time is June, usually near the beginning of the month. At this period the *Corn Cockle* (*M. Githago*) is in flower.

The *Hellebores* are among our rarest plants, and they flower early, viz., in March and April. Like all early flowerers, their flowers endure for several months.

83. *RANUNCULACEÆ*.—The blossoms of *Celandine* (*R. Ficaria*) or (*F.* *ranunculoides*) appear early. The 13th of February, the 17th and 20th of March, are registered dates of its first appearance in flower. *R. auricomus* (Wood Crowfoot) is sometimes seen in flower as early as the middle of April; the 4th, 11th, and 29th are noted. But it will be found in better condition, both for examination and for the herbarium, in the month of May, when it begins to be in fruit. The pure white flowers of *R. aquatilis* (?) may be seen covering the surface of ponds about the same time. This is rarely seen in full blossom so early as the 8th of April. From the 17th April to the 8th of May it usually begins to flower. Like many, or most other spring flowers, it will be found in a better state for investigation or preservation a few weeks or a month later. *R. hederaceus* (Ivy-leaved Crowfoot) will be found about the same times. *R. bulbosus*, when early, flowers at the very end of April, 29th and 30th. Its usual period is the middle of May. *R. acris*, *R. repens*, and *R. Flammula* are somewhat later than the *bulbous Crowfoot*. *R. acris* has been noted as in flower at the beginning of May (3rd); but the dates 15th and 18th of May are nearer the mean time in this latitude. *R. repens* and *R. arvensis* are the latest of the more common *Ranunculi*. The dates of the *Marsh Marigold* (*Caltha palustris*), a very conspicuous plant and flower, are as follow—the 13th, 20th, and 25th of March; and the 18th and 24th of April; the latter dates are unusually late. The *Wood Anemone* (*Anemone nemorosa*) is rather earlier than the *Marsh Marigold*. It has been seen in flower as early as the 8th March; but between this date and the 30th March, and from this to the 17th April, are more usual dates. *Meadow Rue* (*Thalictrum flavum*) is comparatively rare; but it should be looked for about the end of May, or at the beginning of June.

84. The *Water Lilies*, both the Yellow and White, do not flower before June. The 10th and 16th respectively are the earliest dates at which they have been seen in blossom. They remain in flower during the months of June and July.

85. The principle on which the flowering period has been denoted in the descriptive part of this work is the following:—When definite periods of the month are entered, the first is the very earliest time at which the plant has been noticed in flower, and the second is the latest; and it should be remembered that these dates are only applicable to the plants that grow chiefly to the south of London, or from 50½° to 52°.

When the flowering months only are set, it is to be inferred that the exact date is unknown, and that the plant will be found in flower some time in the month. When two months are entered, as for example, March and April, it is to be inferred that it may probably be found in both, but generally towards the end of the former; and during the whole of the latter generally. When a (—) follows a month, and is succeeded by another month, as May—August, it denotes that the plant will be found in flower during the intermediate months of June and July, as well as in May and August. From what has been stated above, as the result of more than twenty years' observation, it may be inferred that it is impossible to fix an exact date when any plant first flowers in any assigned latitude. And it is quite impracticable to approximate to the average time of the flowering of plants extending over a space of nearly 10° latitude. Difference of latitude causes a difference in the time of flowering—so does locality; but temperature and moisture have, as we have seen, a very powerful influence on plants, either in retarding or accelerating their periods of flowering. This fluctuation is as much as a month in March and April—probably a fortnight or three weeks in May, and at least a week at midsummer. If local circumstances—viz., soil and exposure—were uniform, we could, indeed, approximate very closely to the period when these common plants flower, by comparing the average temperature of past years and months with the temperature of the year in which we wanted to know when a given common plant might be expected in flower; but soil and situation are susceptible of so many modifications, that a close approximation is not to be expected. In the early part of the year rain delays the flowering of plants; at this time the earth is usually sufficiently moist, and plants only want heat to accelerate their growth. Towards midsummer they are often delayed from a deficiency of moisture. In general, the monthly average of heat will have a greater effect on plants than the annual average. The monthly averages exhibit a fluctuation of several degrees. For example:

January, $31^{\circ}5$; Fah., 34° , 35° , 37° , 38° $32'$, 40 $66'$; a range of above 9° in seven years.

February: 34° $33'$, 34° , 40° , 43° , 38° , 42° $25'$; range of 9° .

March: 37° $25'$, 42° $22'$, 42° $25'$, 45° , 42° , 44° $5'$, 46° ; range 8° $75'$.

April: 47° , 49° , 52° , 50° $5'$, 49° $75'$, 53° , 49° $5'$; range 6° .

May: 54° , 59° $75'$, 56° $5'$, 54° , 53° $5'$, 63° $33'$; range 10° $28'$.

June: 68° , 60° , 59° , 60° ; range 9° .

July: 70° , 62° , 62° , 61° ; range 9° .

August: 58° $66'$, 70° , 63° , 67° ; range 11° $34'$.

September: 57° $5'$, 59° , 60° $5'$, 51° $5'$; range 9° .

October: 45° $75'$, 56° $5'$, 49° $5'$, 47° ; range 10° $25'$.

November: 43° , 44° $3'$, 43° , 40° $82'$; range 3° $21'$.

December: 39° $5'$, 44° , 42° $75'$, 41° $66'$; range 4° $95'$.

The annual averages are between 49° $75'$ and 51° $5'$; range 1° $75'$.

The average monthly temperature fluctuates about 8° , according to the above, while the annual average fluctuation is under 2° ; and, if

accurately determined by proper instruments, would rarely or ever much exceed one. The general average range, in any given latitude, is not probably above half a degree. The above results were obtained from a series of daily observations, made at 7 a.m., 1 to 2 p.m., and 8 p.m., extending over a period of from five to seven years. It is probable that the general statement of monthly and annual temperatures is too high, as the thermometer was not observed during the night, and a self-registering instrument was not employed. This, however, does not affect the monthly or annual ranges. The annual average temperature of London and its vicinity, *i. e.*, within twenty or thirty miles of the metropolis, is about 50°. The annual average temperature of the south of Devonshire is probably one degree higher, 51°; and it appears that the temperature of the north of Sutherlandshire, Scotland, is 46°. The early flowering plants are nearly a month later in the north of Scotland than they are here; for example, the *Common Primrose*, which flowers here in March and April, flowers in Aberdeenshire in April and May. The *Menyanthes trifoliata* is not more than a fortnight earlier with us than it is in Scotland; and it is probable that the midsummer flowers are only a week later in the northern parts of the island, while the July and August flowers are as early in Scotland as in England. The temperature of the summer months in Scotland is about as high as in England; but the difference of temperature in England and Scotland during the spring months is very considerable.

LEAFING OF TREES AND SHRUBS.

Elm: 21st, 27th of April, and 4th of May.
 Beech: 19th, 25th, 27th of April, 1st and 6th May.
 Oak: 25th and 29th of April, 1st, 3rd, 8th, and 16th of May.
 Chestnut: 6th and 25th May.
 Mountain Ash: 7th, 22nd, and 25th April.
 Cherry Tree: 6th and 7th April.
 Ash: 9th, 15th, and 16th May.
 Hazel Tree: 1st April.
 Hawthorn: 1st and 23rd April.
 Honey Suckle: 14th January.
 Gooseberry Bush: 17, 20th, 25th, and 29th March.
 Dog Rose: 1st and 14th April.
 Birch: 7th, 20th, and 25th April.
 Blackthorn: 21st and 25th April and 4th May.
 Hedge Maple: 20th, 23rd, 25th April, and 9th May.

ASCENT OF THE SAP.

86. The ascent of the sap, as it is termed, depends partly on what may be called mechanical, and partly on vital causes. Heat and moisture are the external stimulating causes; vitality is the modifying cause. By the former the sap is forced into the superior and recently-formed cells; and when the vital energy, or *vis formativa*,

relaxes, the sap remains more or less stationary. In the beginning of summer the productive force of the plant or tree is usually expended, and a cessation of activity is apparent. At the end of summer, or the beginning of autumn, there is in most trees a secondary flow of the sap, and leafy shoots are produced on certain parts of the tree. These shoots and leaves are called midsummer shoots, and may always be distinguished from the earlier leaves by their bright green colour. The mechanical energy is modified by the vitality, and a cessation of growth in one direction is the result. The elimination of the sap, the processes of elaboration and assimilation, are carried on internally; but the upward extension of the plant ceases soon after the full development of the leaves. The few shoots produced at a later period are evidence that the mechanical agents are only in abeyance, not suspended. But in the period which intervenes between the fall of the leaf, and even before the fall of the leaf in autumn, and the swelling and relaxing of the buds in spring, the mechanical power is in complete suspension. The processes of condensation of sap, and induration of wood, in permanent stems, may, and probably are, in active progress; but there are no external signs of activity about the plant or tree. Every part of the plant which is in a vital state (it has been shown, *Physiol.* p. 37, that certain parts of a still vital plant are dead, as much so as timber felled for years, it may even be decayed, or totally absent) is full of sap or air (nature abhors a vacuum). During this dormant state neither the liquid nor gaseous fluids can rise, because there are no newly-formed vessels into which they may flow, or may be impelled by the mutual pressure on the cell walls, caused by mutual expansion of all the tissues by heat. The sap cannot descend, because the vessels below are all filled with whatever may be the contents of the cells. That the sap ascends is a fact well ascertained; that it also descends is rather a fiction than a fact—a deduction from a supposed analogy between the sap of plants and the circulating fluid in animals. The economy of plants is more analogous to the intestinal canal of animals than to their circulating system. In both plants and animals the food enters by one extremity, and the excrementitious parts pass away by the other; but here the analogy ceases, for plants have no organs similar to the stomach, intestinal canal, lymphatic ducts, &c.; and nothing like the complicated systems of circulation and respiration necessary to animals. Every cell, in every living organ, must be more or less distended; it must be full of fluid, either liquid or aerial, otherwise it would collapse, or be obliterated, and cease to be a vital, integral part of a living organism.

The ascent of sap is ascertainable. It must have ascended into the topmost twigs; and as it is originally derived from the soil by the roots, it must have had a progressive ascent, slow, no doubt, but gradually ascending with the elongation of the tree. The descent of the sap is inconceivable, except artificially, by tapping the tree, because there is no natural egress for it below. It has never been imagined that it escaped by the spongioles of the root. The formation

of wood is an obscure subject, and has been rendered obscurer through the perplexing hypotheses and experiments that have been devised or instituted with the view of explaining it. Whatever may be its origin, it does not originate in the descending, condensed, and indurated sap. There is no sufficient proof that the sap ascends into the leaves—that it is elaborated in them, and returned thence fit for assimilating with the plant; as in animals the blood which has been purified from its carbon by contact with air in the lungs returns into the heart, and thence distributes nourishment and warmth through the whole body. We know that the wood is formed simultaneously with the other tissues, the pith, the medullary rays, and the bark. As a plant increases in length it also increases in diameter (if dicotyledonous). The woody part of herbaceous stems is formed long before the sap ceases to ascend—often before the leaves are developed, and always before the seed or fruit is mature; but, until the period of maturation is completed, there is sap existing in some part or other of the stem, and the slight movement—if movement it may be termed—is certainly upwards, not downwards. In inorganised objects the law of development is more easily discoverable than in organised beings. The development of a crystal, in a solution which contains crystalizable matter, is more easily ascertained than is the growth of a plant or of an animal; because in the former, viz., the mineral, the process will go on regularly, continuously, and as long as the solution is supplied. In the crystal, there is no law of limitation either of space or duration, except the non-supply of matter in a state of solution, *i. e.*, capable of being added to what was previously formed. Plants and animals are limited in their growth by laws peculiar to themselves, and these laws are not affected by the supply of food and room for development. We find that every living being is subject to laws which vary with the varying idiosyncrasies, peculiarities, or properties of every species. For example, the annual plant only flowers once during the whole period of its existence; the shrub never becomes, under any circumstances, a tree, and trees vary as much from each other as shrubs vary from trees. We certainly do not approximate to the cause of this variation by simply stating that a certain tree or plant, or class of trees or plants, assumes such a size, form, structure, &c., simply in obedience to the law of its own being. We are unwilling to admit our ignorance of the causes which produce these varying results, and we strive to hide it often under a surplusage of words—vague, indefinite generalities, which mystify, but convey no clear, intelligible notion to the mind. The formation of cells, of vessels, of tissues of all sorts, of pith, wood, or bark—of flowers, fruits, and seeds—all are alike obscure and incomprehensible. The legitimate object of science is to announce facts—to observe phenomena—to show the relation between the means and the end—to explain, as far as possible, the admirable arrangement of the different parts, which so harmoniously concur in producing certain results—to trace their mutual dependence on, and perfect adaptation to, each other. There are mysteries in nature as there are everywhere else;

there are limits to the *knowable*; there is an instrumentality, a power and capacity in living organised objects which the keenest eyes, and the most powerful microscopes, never will detect; and the time, talent, and energy wasted in vain efforts at explaining the incomprehensible, would, if applied to the observance of facts, and the investigation of phenomena, speedily rescue natural science from the reproach of being only the science of theories, systems, mystifications, and logomachies.

4 87. *Physiology of the Reproductive Organs.*—The outer and inner floral verticils, or the calyx and corolla, usually termed the non-essential parts of the flower, are the external envelopes of the stamens and pistils. The term non-essential organ is not scientifically exact, nor, philosophically, quite accurate. If non-essential, why is it present in most plants?

It is not universally present in all plants. The cell is the only organ universally present in all plants, and it forms the sole constituent of half the Cryptogams. If universal presence in every individual of the vegetable kingdom be the test of essentiality, the stamens and pistils are non-essential, for they are absent in a third part of known plants. It is unphilosophical to call these envelopes unessential, for nature forms nothing in vain—nothing which does not contribute to the preservation or reproduction of the individual of which it forms an essential part. It is more correct to say that a calyx and corolla are not necessary to all plants. The cell, as above stated, is absolutely necessary to all plants, but it is never stated that the *elaters*, *spirals*, *vascular*, or *woody bundles*, &c., which are not universally present, are not essential to the economy of the plants wherein they are produced. Again, a large number of plants produce reproductive bodies without the intervention of stamens and pistils. The outer envelopes are protective of the more tender parts of the blossom, and are to be considered as indispensable organs wherever they are found—as necessary to the production of fruit as leaves are necessary to the vegetation and maturity of the plant. The calyx is oftener persistent than deciduous. All monosepalous (gamosepalous) calyxes are permanent; and they are persistent in several orders where the calyx is parted. It is persistent when it is superior or above the ovary. In this case it forms a crown to the fruit. In certain orders of plants, where the ovary is more or less connected with the calyx, the latter constitutes part of the fruit, as in the *Rose*, *Gooseberry* and *Apple*, and is consequently persistent. The corolla, after impregnation, decays, and either falls off, or withers upon the organs of fructification, or on the fruit. The corolla is never permanent, as the calyx often is, viz., in a vigorous or vital condition. The calyx, when persistent, never withers, but becomes part of the fruit, or serves for a protection to it. The corolla, when persistent, is always so in a withered or dead condition. The stamens and styles, though generally contiguous and surrounded by the corolla as with a fence, are sometimes on distinct parts of the plant. In the *Carices*, and in many of the other genera of *Cyperaceæ*, the stamens

and styles either are on different spikes, or on the same spike; but always more or less distinct, though on the same plant. In the *Salices* and other *amentiferous* genera, the stamens and styles are on different plants. It is generally believed that the pollen-grains are necessary for fertilising the ovules; though there are some examples of female blossoms, as they are called, bearing fruit and seed without the interposition of the pollen-grains. But a few exceptions cannot be considered as decisively contradictory of the general fact, that bodies of both kinds are present (both stamens and styles), and that both are necessary.

There is a more important question now agitated in relation to the pollen-grains, viz., whether they are the real parents of the future plant, or only the means of fertilising the ovules. Schleiden and some other German botanists maintain, that the pollen-grain, or cell, is analogous to the reproductive cell in Cryptogams, with this difference, that while, in the latter, the germinating cell falls on the ground, and is capable of reproducing a plant like its parent, the pollen-grain requires such a medium as the ovule is stated to be, wherein it is developed into a state intermediate between the original pollen-cell and the development of the embryo; or, in other words, that the pollen-grain becomes the embryo, but only through the intervention of the ovule, and that it is capable of existing in this condition a longer or shorter period. It is to be hoped that this is not a dispute about a point which probably cannot be decided in favour of either view. The subject is confessedly very obscure, viz., whether the seminal matter in animals, and the pollen-grains in plants, are the rudimentary embryos in either case respectively, or whether the embryos are only fertilised by the seminal matter or pollen-grains; or, in other words, as above stated, whether the pollen-grain or the ovule is the parent of the future plant.

88. *Physiology of the Embryo*.—The reproductive cell, or spore, of cryptogamous plants would, in all probability, soon lose the capability of germination, if it did not find a medium suitable for its development. The embryo of phænogamous plants can retain its vitality for a greater or less period in the state of seed. Some seeds are reported to have germinated hundreds and thousands of years after their production on the parent plant. Mummy wheat is said to have grown after an entombment of more than three thousand years. Other astounding facts are asserted about the duration of vitality in seeds when excluded from atmospheric influences; and several of these are grounded on good authority. By others these facts are questioned, and, *prima facie*, they appear so very extraordinary as to require the strongest confirmation. It is well ascertained that some seeds resist decomposition for long periods, especially if they be protected from moisture, air, and light. When subject to these stimulants, they either germinate, or are decomposed into their original primary constituents. Every perfect seed contains within itself sufficient nutriment for its development, till it is in a condition to absorb nutriment from the soil, or the medium on which it is destined to grow, and to fulfil its destiny in the general economy of nature.

89. Most plants, like animals, decay and perish from the effects of age, and only a very few species prolong their existence beyond the space of from two hundred to six hundred years. Some trees are very tenacious of life, as has been already stated; but, after certain definite periods, all plants, even those most remarkable for longevity, decay and perish, either through the rupture and consequent destruction of their internal organisation, or from the effects of accidents, injuries, atmospheric influences, &c. Like other organic objects, they are finally resolved into their constituent elements. It is easy to foresee, that soft, cellular substances, as Funguses are, cannot have so protracted a duration as the Oak or the Yew, under the shade of which they are produced. The mystery consists in the fact, that carbon, oxygen, hydrogen, &c., are the elements or bases of both the Fungus and the Oak. All we can ascertain is, that these constituents are differently combined in these very dissimilar objects.

90. *Duration of Plants.*—Many species of plants complete the term of their existence as organised beings in a few weeks or days; some of the Fungi in a few hours. Others are as remarkable for the great extent of their duration. There are trees of exotic growth that are believed to have been growing for thousands of years. Our Yew trees, the natural growth of our chalk-downs, and the venerable living occupants of many of our churchyards, are known to be of a great age, and have the appearance of almost perpetual duration, the principle of vitality being so strongly exerted by every part of them, from the root to the topmost branches. Many Oaks, Chesnuts, &c., are also ascertained to be of great longevity—to have been in existence during hundreds of years. The common division of all plants into *annual*, *biennial*, and *perennial*, is, in some respects, vague or indefinite. Many species of acotyledonous plants, Fungi and Algæ, for example, spring up from spores or sporules, vegetate and produce other spores or sporules in a few hours or days; only a few last a month, and very few exist more than a few months. There are plants of the *Alsinaceous* section of the order *Caryophyllaceæ* that vegetate and produce seeds in a few weeks. They certainly produce seeds early enough in the season to vegetate, and bear a second, or probably a third, crop in the course of a season. The division into annual and biennial is inconvenient, inasmuch as every annual that can bear a mild winter, may become biennial merely from the accident of dropping its seed late in the season, when it could not produce its flowers nor mature its fruit, although it might have done both, if the seed had been deposited at an earlier period. Still the plant may be very properly denominated an annual, if its general economy be to produce fruit (seed) within the year, if sown in proper time. A strictly biennial plant does not produce fruit in the same year when its seeds are deposited in the ground. It may resemble an annual so far, that when late sown it will produce flowers and fruit as soon as a late-sown annual; but it always (generally) requires two seasons to accomplish the object of its being (creation). Therefore the cultivated *cereals*, Wheat, Rye, Barley, Oats, &c., are not necessarily biennials;

though they are sown before winter, and may be said to grow during a part of two seasons. The common Turnip is an example of a strictly biennial plant, which never produces a flowering stem, with flowers and seeds, before the second year of its existence, whether sown early or late. Cabbages, Coleworts, and their varieties, do not usually flower, when permitted, before the third year. The first year they are seedling plants; the second they afford leaves for culinary uses; and during the third year they shoot up a stem, and bear flowers and fruit. It is doubtful whether or not the *Cow Parsnep*, the *Wild Angelica*, the *Carum carui* (common Caraway), be biennial, or of longer duration. There is a plant of the *common garden Angelica* (*Archangelica*), in the author's garden, which is probably three years old, certainly two, and it has not yet flowered. A more scientific division of plants by duration would be into such as flower only once in their lives, *i. e.* never flower again, but perish after they have matured fruit, like the Carrot, the Parsnep, &c. Under this division it would be necessary to include the famous *American Aloe*, which is fabled to flower only once in a hundred years. It is a fact that it only flowers once in its life, and it may live to an indefinite period. All plants would thus be divided into—1st. Such as flower only once in their life, whether in their first year, second year, or their third year, or even in their sixtieth year; and, 2nd, Such as flower more than once before perishing, whether the duration of such be five, seven, or an indefinite number of years. It is a fact that annuals and biennials may become of several years' duration simply by preventing their flowering. Hence *Garden Parsley* (*Petroselinum sat.*) may be preserved for several years by cutting or pinching off the stems soon after they make their appearance. In conformity with long-established usage, the duration of plants described in this work is denoted by the term *annual*, when the plant, under favourable circumstances, generally flowers during the first year of its life; and *biennial* when it does not flower before its second, or even third year, provided that it flower only once, and that not generally within the first year of its existence; and *perennial* when it flowers oftener than once, even though its whole duration may be shorter than those denominated *biennials*.

MORPHOLOGY.

91. *Morphology* treats of the formation, shape, and position of organs. The primary organ of every plant is the cell, as already stated (sect. 2). This is composed externally of *membrane*, internally of *fibre*, or viscid, granular matter, deposited on the inside of the cell-wall. From this elementary organ all the varieties of tissue are produced. The primary cell or cells are capable of reproducing similar cells, either externally, in which case the original or mother-cell exists with the produced or daughter-cells, or a series of cells are produced internally;

and, in this latter case, the original cell perishes, or is absorbed by the others. The simplest forms of vegetation are entirely cellular. The Snow plant (*Protococcus nivalis*) consists of a congeries (mass) of simple cells. In *Vaucheria*, another *Algal*, the cells are simple, as in *Protococcus*, but differ from those of the latter in being elongated or lengthened. These two facts, the round or rounded shape of the cell in *Protococcus* and the elongated shape of the cell in *Vaucheria*, illustrate the morphology of the simple organs, proving the identity of principle or origin in the cells of these two genera of *Algæ*. Science is unable to assign a reason why the cell in the one is spherical or polygonal, and in the other cylindrical and elongated. The power of vitality resident in living organisms is usually adduced in support of every obscure phenomenon, either of animal or vegetable physiology. Why the same organic constituents should assume such infinite diversities of form, structure, and development, is yet a mystery. Science can only state the facts.

92. *Morphology of the Simple Organs*.—There is a remarkable coincidence between the simplest forms of plants and the primary forms of all plants. The *Algæ*, *Fungi*, and *Lichenes*, or the class *Amphigens*, *Endl.* consist of a series of repetitions of the same simple organ or organs, being homogeneous or similar in their structure, nearly as much so as an inorganised object. One portion will be a tolerably exact representation of any other. These plants have no external organs, neither root, stem-leaves, nor flowers, and hence they may be called inorganised. They are either amorphous (without definite form), like many *Fungi* and *Lichenes*, or they have definite forms, like many of the *Algæ* and *Fungi*, though quite homogeneous in structure. In like manner, all plants in their origin are wholly cellular and homogeneous in structure, and their organs, viz., the *radicle*, *plumule*, and *cotyledons* are rudimentary. In their nascent (growing) state they continue cellular. The vascular or fibrous tissues are developed subsequently to the cellular tissues, and as the plant grows its various organs are progressively developed till it reaches maturity.

In the lowest orders of plants, viz., *Amphigens*, *Endl.* (*Algæ*, *Fungi*, *Lichenes*), the whole plant is composed of cells; and in this respect these three orders are analogous to the embryonic or rudimentary state of plants belonging to the higher orders.

93. In *Hepaticæ*, *Musci*, *Filices*, and the other higher orders of Cryptogams, a more complex organisation is observed. *Elaters*, *vascular tissue*, and woody fibre appear among the simple internal organs, and there are rudimentary stems, leaves, and spore-cases among the compound external organs. The plants of these orders have, therefore, some considerable analogy to the more perfect plants while growing and only advancing to maturity.

94. *Morphology of the Compound or External Organs*.—The external or compound organs—viz., the root, the stem, the leaves, the flower, the fruit—with their several appendages, constitute, morphologically, two systems of organs, or are reducible to two normal forms. The *axial organs* comprehend the root, the stem, the branches, if present, the

peduncle or pedicel, the torus or disk, the stipe of the ovary, if present, and the podosperm, or stalk of the seed. The *lateral organs* include the leaves, the bracts, if present, the calyx, the corolla, the stamens, and the ovary or carpellary leaflets. It is evident that the stem or axis is the medium of communication or of connexion between the root and the leaves, the flowers and the fruit. The root may be regarded as a downward prolongation of the stem, as the peduncle, the flower and the fruit are an upward elongation of the same organ. The normal form of the root is cylindrical, more or less tapering, and, like the stem, protruding lateral shoots, sometimes from just below the collar, sometimes from the middle, or a little below the middle, and occasionally from the very extremity of the root. This property is also characteristic of the stem. It is either branched from the very root, or from below, or above the middle, or only at the very top: the former state of the stem is characteristic of shrubs; the latter states are the normal forms of trunks of trees. The fibrous root differs from the perpendicular, or tap root, exactly in the same manner as the stem or stems of a shrub differ from the normal form of the stem of arborescent plants. The fibrous root emits a tuft of fibres immediately *below* the crown of the root; and the shrub throws out a greater or less number of branches from a point just *above* the crown of the root.

95. Many roots are, in their structure, allied to stems. For example, the roots of trees and shrubs (dicotyledonous trees and shrubs) have distinct wood and distinct bark. In their position and functions they are distinct from stems; but in structure and even in form, they are analogous to stems. As the stem is the medium of communication between the root and the superior organs, the root is the medium of communication between the earth and the stem. Some herbaceous plants have roots which are also very much like stems in structure. For example, many umbelliferous plants have roots, which like the Carrot and Parsnep are furnished with distinct bark. Several cruciferous plants are like the Turnip, in which there is a bark or rind quite distinct from the internal part, and differing from it in taste as well as in structure. The direction of the root normally coincides with that of the stem, the only difference being that the tendency of the root is downwards, while that of the stem is upwards. The aberrations from the normal type or form of the root are probably not more numerous than they are in the stem. The position or direction of the root is, of necessity, more modified than the direction of the stem is, because the former is developed in a medium very different from that in which the latter grows. These modifying circumstances the root has no possibility of controlling. At a greater or less depth from the surface of the earth the soil is always hard, both impenetrable by the tender fibres of the root, and incapable of yielding any nourishment to the plant. Hence the branches or fibrous parts of roots are compelled to assume a more or less oblique or even horizontal direction, being unable to penetrate in a position exactly opposite to the stem, and also being unable to extract nutri-

ment from the soil in that direction. Roots are materially influenced by temperature and exposure, as well as by the soil and the obstacles in it that hinder their development in a normal direction; yet, even when they manifest a tendency either to rise to the surface, where the soil is generally more fertile, or to traverse long distances to reach water, the direction of the rootlets or fibres of the root are always downwards towards the earth's centre.

96. Branches are precisely analogous to stems, each branch becoming a lateral axis, and constituting another and distinct centre of vegetation. The peduncle, as above stated, is merely a continuation of the central axis, and constitutes the axial organ on which the different parts of the flower and of the fruit are arranged exactly as the leaves regard the stem and branches as their axis; the calyx, corolla, and other floral verticils surround their torus and axis as their respective centres. Sometimes the stalk is reduced to a peduncle, in which case the leaves, if present, are radical, and the flowers may be single (solitary) or several, either in proximity or spreading. The Dandelion, Cowslip and several Compositæ illustrate these modifications of the stem, and also this character of the inflorescence.

97. The lateral organs are the leaves, the bracts, the sepals, the petals, the stamens, and the carpellary leaves or leaf (ovary). These organs all correspond in their structure, their shape, and their position; they are all, more or less, thin flattened expansions, mostly composed of cellular tissue and some fibre, with a greater or less horizontal divergence, and always regarding the stem as their centre and axis. The leaf, and especially the leaf-stalk, has a considerable analogy to the stem or branch, and especially when the latter is in a green or nascent condition. In a recent state, both are chiefly composed of cellular tissue covered with an epidermis, with or without epidermal appendages, and both are provided with stomata. When these are present on the leaves they are also present on the young stem or branch. The midrib of the leaf or the petiole, if present, coincides with the stem in structure and functions. It is composed of bundles of vascular fibre, contained by cellular tissue; and so is the stem. The midrib or primary nerve, is a centre or axis of growth to the lateral nerves, as the stem is to the branches; and the nervation of the leaf, both in position and functions, corresponds with the branches of the stem. The angles of divergence are nearly of the same extent in both. The bark of the stem and the interstices or parts not occupied by the nerves in leaves, are composed of cellular tissue, and both have the cuticle or epidermal covering. There exists also between the leaves and stem a coincidence in functions, namely, that where no leaves are present, the stem, or at least the recently produced or green and juicy part of it, performs the operations of respiration and exhalation, which are the special functions of leaves, the stems in such instances being provided with stomata. Radical or root leaves are always arranged in a more or less complete rosette; they radiate from the crown of the root or from the apex of the underground stem, like the petals of a double Rose. In leafy aerial stems the normal position of the leaves is

opposite (viz., one on each side of the stem, from the same point of it), or alternate (on opposite sides of the stem, but not opposite to each other, there being an internode between single leaves), or scattered (where the leaves are arranged on all sides of the stem, some nearly opposite, and others alternate, as in the common Toad-flax). When the stem is abruptly shortened, or its growth interrupted, alternate leaves become opposite and whorled, as in several *Rhododendrons*. In *Lysimachia vulgaris* there are opposite, alternate, and whorled leaves on the same individual, caused either by vigorous growth in the stem, or by an interruption to its development. When this interruption occurs towards the end of a branch the leaves are tufted or in a rosette. This is the natural situation of the leaves in the Purging Buckthorn. In the sub-order *Stellateæ* the normal condition of the leaves is whorled. See *Galium*.

98. *Bracts*.—Except in position there is no difference between *bracts* and leaves. In the axils of the latter, leaf-buds are produced, and flower-buds are produced in the axils of the former (bracts); the bracts are consequently situated higher up on the stem. The leaf-bud produces several leaves on an elongating axis, which subsequently is developed into a branch. The flower-bud, on the contrary, is not elongated: but its extension is interrupted, and the various whorls of which the flower is composed, assume an opposite and whorled, instead of an alternate, position. The first series or whorl is termed the *calyx*, the leaflets of which differ from true leaves only in being smaller, and occasionally less or more coloured. The first series is the lowermost

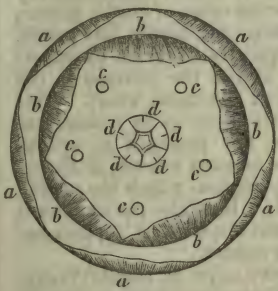


Fig. 97.

in position, and is also the outermost of the floral whorls (verticils). The annexed diagram shows the position and arrangement of the several whorls of a perfect or normal dicotyledonous flower. The outermost or lowest series, *a a a a a*, represents the calyx, which consists of five sepals, either distinct or coherent. The second series, *b b b b b*, represents the five petals of the corolla, either in a state of separation or of cohesion. The third series, *c c c c c*, represents the five stamens; and *d d d d d* the five carpellary leaflets, which unite by their edges in the centre, and form the five-celled ovary. The normal number five is

present in a perfectly regular flower, each of the verticils consisting of five separate or coherent pieces; and the arrangement of the several whorls is also normal (symmetrical). The petals are placed alternately with the sepals; the stamens alternate with the petals, but are opposite to the sepals; and the carpellary leaflets are alternate with the stamens, and opposite to the petals. Five is the normal number in dicotyledonous plants, and this is the law by which they are arranged. The numerical law is often modified by adhesion, abortion, and redundancy. First, the sepals and petals may form a monosepalous (gamo-

sepalous) calyx, and monopetalous (gamopetalous) corolla, or two of each only may cohere, and thus a tetrasepalous and tetrapetalous flower will be the result. One member of a series, as a sepal or petal or stamen, may be abortive, and the result will be the same, as the union of two sepals or of two petals. An addition may be made to the normal number by the splitting of one or more organs, or the organs may be increased by redundancy, when one or more individual organs are added to the normal number, or when an entire series or whorl is added. This is the case in some double flowers, where the increase of supernumerary organs is not occasioned by the degeneration of the stamens, but is a positive addition to the normal number of petals.

99. This explains what was before stated as a distinctive mark of dicotyledonous plants, that the normal number is five; but it is sometimes diminished by a suppression of one-fifth of any one or all of the series, and the tetrasepalous, tetrapetalous, tetrandrous, tetragynous flower is the result, or there may be a suppression of three-fifths of one series of organs—the stamens, for example; and the diandrous flower is the result, as in *Veronica*, in which there is also a suppression of one-fifth of the number of sepals and petals. An addition of one-fifth or two-fifths of the normal number of stamens will constitute a hexandrous or heptandrous flower. Most of the floral whorls are occasionally accompanied by supernumerary whorls. The calyx has an *under calyx*, or double calyx in *Malvaceæ*, in part of *Rosaceæ* and *Convolvulaceæ*. This may be regarded as a supernumerary whorl to the calyx. The corolla is often susceptible of several supernumerary whorls. It is probable that this is oftener the cause of double flowers than the degeneration or change of stamens and pistils into petals. The number of stamens is still more frequently increased by supernumerary development than the corolla is, and the increase in the number of these organs is often caused by an additional whorl. This is the case in decandrous plants, and still more so in icosandrous plants, where the stamens are indefinite, but arranged in several whorls. Supernumerary pistils are present in many flowers, as *Rubus*, *Potentilla*, *Ranunculus*, &c. In monocotyledonous plants the normal number is three, as has been stated (sec. 41). Here also the number is modified by abortion, coherence, and the development of supernumerary whorls, &c., as in the dicotyledonous species.

100. When one of the floral envelopes (calyx or corolla) is suppressed, the flower is said to be *monochlamydeous* (having but one floral envelope). In this case the floral envelope is usually called the *perianth*, or the *perigone*, when the blossom produces only either stamens or pistils separately. When both envelopes are suppressed, the flower is *achlamydeous* (without a perianth). When only stamens are produced on one part of the plant, and only pistils on a distinct part, or when these interior floral whorls are on separate, and more or less distant parts, the plant is termed *monœceous*; if the stamens and pistils be on different plants, the blossoms are termed *diœcious*. The arrangement of the floral whorls is frequently irregular, by the suppression or abortion of some of the usual whorls, or of the super

numerary whorls. For example, if the stamens be opposite to the petals, as in *Primula*, it is conjectured that there is one row of stamens suppressed, which suppressed row is supposed to be (should be) alternate with the petals (lobes), and the existing row alternate with the outer suppressed one, which was (would have been) normally arranged. There is some plausibility in the conjecture of a suppressed row of stamens and the teeth which crown the tube of the corolla in this genus may be abortive stamens. Barren stamens are not uncommonly associated with antheriferous stamens, and their arrangement is regulated by the same law of alternation, which appears to be the principle on which all the floral organs are arranged. The petals differ from the sepals chiefly in their more delicate appearance, in their vivid colours, in being the general scent-receptacles of the plant; but in their structure, position, and functions, they are perfectly analogous to the sepals. Their position is above the calyx, and when the latter is developed, they are in its interior. This, however, is not always the case; the calyx is reduced to a mere rim in certain orders, as *Valerianaceæ*, and in some genera of *Compositæ*. It is developed as minute teeth in many *Umbelliferae*. In becomes linear segments in *Onagraceæ*. The stamens differ in shape and functions rather than in structure, from the external envelopes. This being the fertilizer of the ovules, is reckoned the most important floral organ. The superior or innermost floral organ, the pistil crowns the stem, and terminates its growth in that direction.

101. *Morphology of irregular Floral Envelopes, and of the Stamens and Pistils.*—The irregular monopetalous corollas usually assume the *bilabiate*, or the *ringent*, or the *personate* forms. All these forms originate in the cohesion of the petals, three forming the lip or lower limb, which is more or less three-cleft, or with three notches. The upper is formed of two cohering petals. The bilabiate corolla differs from the ringent or gaping corolla only in having the lips nearer each other. In the ringent form they separate widely, as in *Rhinanthus* and *Pedicularis*. The personate corolla has a very prominent *palate* which closes the throat. This form is exemplified by *Linaria vulgaris*, the *great Snapdragon*, &c. The law of alternate arrangement is prevalent in corollas and calyxes formed by the union of the petals and sepals. The bilabiate calyx has its upper lip formed of three sepals opposite to the two petals, which form the helmet or upper lip of the corolla, and the position of the latter is alternate with that of the former. The two sepals composing the lower lip of the calyx are opposed to the three petals forming the lower lip of the corolla, thus preserving the law of alternation in their arrangement.

In one of the sub-orders of the *Compositæ*, viz. *Cichoraceæ*, many or most of the flowers (corollas) are ligulate (strap-shaped), connected at the lower part or base, and forming a short tube, and an elongated linear limb, five-toothed at its margin. This is another example of the cohesion of five petals, forming a monopetalous corolla, the two exterior petals being only united just at the base. Irregular polypetalous corollas are chiefly present in the orders *Ranunculaceæ*,

Fumariaceæ, and *Leguminiferæ*. In *Helleborus* the petals are folded and shaped like a horn; in *Aquilegia* they are hooked at the base, and hollow. They form long-curved tubes in *Aconitum*. In *Fumitory* the petals are gibbous (swollen or enlarged) at the base, and two of them cohere by their margins, near the extremity. In *leguminiferous* plants the upper lip is much enlarged, and the two lower ones are often coherent. This form is termed the *papilionaceous* corolla, from its fancied resemblance to the wings of a butterfly (*Papilio*). In several orders and genera, as *Violaceæ*, *Linaria*, &c., one of the petals, or more than one, bear a spur at the base.

102. In several orders the stamens adhere by the base of their filaments, forming three or more spreading tufts, as in *Hypericaceæ*. In *Leguminiferæ* nine of them are often connected by a web-like process, which extends nearly to their tops, while the remaining one is free. In *Malvaceæ* and *Geraniaceæ* all the stamens are connected by a membrane, which closely invests the styles. In *Compositæ* and *Violaceæ* the anthers are united, forming a tube, which closely embraces the style (*Syngenesious*). In *Salvia* the stamens are cleft, one of the branches only being fertile or antheriferous. In some plants, as, for example, in the White Water Lily, the petals either become stamens, or the stamens degenerate into petals, and the transition is so gradual that it is scarcely possible to distinguish the one set of organs from the other, or to ascertain where the one ends and the other begins. The structure of the pistil is affected by the same causes, whatever these may be, which occasion adhesion, abortion, or multiplication of the other series of organs. It has already been stated that the appendicular organs, as prickles, hairs, spines, tendrils, &c., are but modifications of the cuticle, the branch, the leaf, or midrib, &c. The science or study of aberrations from the normal type, *i.e.* of abortions, suppressions, or non-development of organs, multiplication of parts, degeneration, or the mal-formation of parts, division of parts, &c., is called Teratology (*τερας*, a monster, and *λογος*, treatise).

103. Morphology neither can explain, nor does it profess to exemplify, the change of one organ into another: as for example, the change or transformation of a stamen into a petal, or *vice versâ*. On the contrary, it is a universally received law, that a leaf never becomes a petal,—that a stamen never becomes a pistil. A leaf, or modified leaf (scale or bract), may supply the place of a corolla or petal, as in the amentiferous orders. Both anthers and stigmata are sometimes borne on the same column, as in several orders, and among others in the Orchids. But these organs never were developed in the normal state of leaves, filaments, and styles. Morphology treats of modifications of formative power, not of the change nor even of the modifications of organs. That part, which under ordinary circumstances might have been developed by the formative energy of the plant as a leaf, may, under a change of circumstances, become, by the same power, a sepal or petal, a stamen or a pistil. Practical florists, by a certain treatment, can accelerate or retard the flowering of plants; or, in other words, may, by withholding manure and water at certain periods in

the life of the plant, cause it to produce flowers at a point where it would, if abundantly supplied with nutritious matter, have produced leaves and a more lengthened stem. The cultivated oat often produces several leafy stems, sometimes from ten to twenty, from the same root, and some of the panicles may be from twelve to eighteen inches long, bearing not scores, but hundreds of individual grains. In poor, sandy, dry soils, there are some plants of oats occasionally found which bear one leaf on the stalk, and the stalk bears only a single grain. This not uncommon fact is an illustration of what is properly understood by morphology—a formative energy modified by circumstances. In an ordinary field each grain of oats produces a single stem, with from four to six leaves, and as many joints (internodes), with a panicle eight to twelve inches long, with from sixty to a hundred grains. In rich fresh land, where the plant had room to tiller (branch at the root), several leafy stems are usually produced, each stem bearing from a hundred to a hundred and fifty grains. In very poor dry soils a single grain of oats never produces more than one stem, and stems bearing from one to six grains. The formative energy resident in seeds of equal qualities is thus modified by external circumstances, which the plant is incapable of controlling.

The cut in the margin represents a small portion of a specimen of *Apium graveolens* (Common Celery). The primary rays of the umbel, instead of bearing the umbel or partial umbel, as in the common form, assumed a branch-like form, bearing only partial umbels and single flowers, with enlarged bracts.



Fig. 98.

GEOGRAPHY OF PLANTS.

104. *Distribution of Plants in relation to Soil and Situation (habitats).*—Many species of plants, and some genera, are limited to certain kinds of soil. Some Ferns, as *Asplenium septentrionale*, grow only on trap, basalt, and similar sorts of rock. *Polypodium calcareum* seems to be confined to limestone districts. The *Orchids* are the most remarkable examples of species and genera, mostly restricted to cretaceous and calcareous soils. Several of these beautiful objects are only to be found on chalk, as *Ophrys arachnites* and *O. aranifera*; some grow both on chalk and limestone, as *Ophrys apifera* and *O. muscifera*; and some are found on most soils indifferently, as *Orchis morio*, *O. mascula*, and *O. maculata*. In the orchid family the plants which have the most extensive range, and which grow on the greatest number of soils, are the most numerous as individuals, and grow in the greatest number of distinct places. The most beautiful of all the British Orchids, *Lady's Slipper* (Cyp. cal.), is confined to the limestone, and but two or three stations are known where it grows, and only a single plant or so is to be seen at any one time. The *O. arachnites* is limited to one or two localities in South Kent. The *Bee and Fly Orchises* are more common, and are often found in considerable numbers. The *O. mascula*, *O. maculata*, and *O. morio* are much more common. A particular soil is not essential for them, but particular localities are, viz., woods, commons, heaths, meadows, and other undisturbed places. *Orchidaceæ* is the only order that, for the most part, prefers the chalk and limestone; that is, more species grow on such soils than on all other soils together. Besides the Orchids, which prefer chalk, limestone or marl, the following genera—viz., *Paris*, *Taxus* (Yew), *Fagus* (Beech), *Buxus* (Box), *Thesium* (Toadflax), *Origanum* (Marjoram), *Chlora* (Yellow-wort), *Phyteuma* (Rampion), *Caucalis* (Bur Parsley), *Daucus* (carrot), *Libanotis* (Mountain Parsley), *Delphinium* (Larkspur), *Adonis* (Pheasant's-eye),—prefer chalk, though some of them are occasionally found in marly or sandy fields. The following species are chiefly found on the chalk or limestone, besides the *Orchids* above noticed:—*Brachypodium pinnatum*, *Bromus erectus*, *Avena pubescens*, *Carex digitata* and *C. humilis*, *Ajuga reptans*, *Galeopsis versicolor* and *G. Ladanum*, *Linaria repens*, *Verbascum Lychnitis*, *Lithospermum purpureo-cæruleum*, *Campanula Trachelium* and *C. glomerata*, *Gentiana amarella*, *Crepis biennis*, *C. fetida* and *C. taraxacifolia*, *Cineraria campestris*, *Scabiosa columbaria*, *Galium tricarne*, *Asperula cynanchica*, *Bupleurum rotundifolium*, *Petroselinum segetum*, *Pyrus Aria*, *Spiræa filipendula*, *Hippocrepis comosa*, *Anthyllis vulneraria*, *Onobrychis sativa*, *Linum angustifolium*,

Geranium columbinum, *Hypericum montanum*, *Arenaria tenuifolia*, *Cerastium arvense*, *Reseda lutea*, *Papaver hybridum*, *Anemone Pulsatilla*. Some of these species are occasionally found on other soils.

105. The following genera prefer limestone soils, viz.—*Achyrophorus*, *Meum*, *Trinia Actæa*, *Trollius*, *Polemonium*. The following species are most commonly found on the limestone, exclusive of the species of the above-named genera, viz.—*Gentiana verna*, *G. amarella* and *G. campestris*, *Carduus eriophorus*, *Rubia peregrina*, *Galium pusillum*, *Geranium sanguineum*, *G. sylvaticum* and *G. pratense*, *Silene nutans*, *Dianthus cæsius*, *Hutchinsia petræa*, *Draba incana* and *D. muralis*, *Cardamine impatiens*, *Arabis stricta*, *Thalictrum minus*. Some of these are found on other soils; but they are most abundant on the limestone tracts.

106. Most grasses prefer a light sandy soil. The *Ericas*, and kindred genera, love peat, or a sandy, peaty, moist soil. The *Oak* prefers marly clay, the *Hornbeam* a stiff, cold, damp clay. Most of the old Pollards in Epping Forest are Hornbeams. The *Pine* loves a gritty soil. The *Carices* (Sedges) seem to luxuriate in a soil which contains a considerable portion of iron. The *Droseras* require a peaty soil. Plants in general depend more on habitat (situation) than on soil; for example, more plants are confined to water, watery places (marshes), sea-shores, alpine and mountainous rocks, fields, meadows, heaths, woods, hedges, lanes (near houses), and road-sides, than are restricted to particular soils.

107. The *Fresh-Water Plants*—that is, such as grow solely in water, and those that grow in marshy or watery places—comprise a large proportion of the British plants. These two classes of plants are not susceptible of strict separation; for some of them are found sometimes in water and sometimes in marshy ground, as several of the *Carices* (Sedges) for example. Some grow by river-sides or ditch-sides, partly in water and partly on land. The agrarial or field plants grow also by road-sides and under hedges, where the soil is moved occasionally. Some of the sylvestral or woodland plants grow in hedges, also on heaths and commons. The plants that are classed under the terms sylvestral, paludal, aquatic, &c., have a preference for woods, marshes, water, &c.; that is, more of them are found in such habitats than in any other.

108. *Aquatics*—About one-thirteenth of the British species of flowering plants grow exclusively in water, viz., 1 species of *Equisetum* (*E. limosum*), 10 *Gramineæ* (certain species of *Glyceria*, *Poa*, *Catabrosa*, *Alopecurus*, *Leersia*, &c.), 8 *Cyperaceæ*. All the species of *Eriocaulaceæ*, *Typhaceæ*, *Lemnaceæ*, *Potamaceæ*, *Zosteraceæ*, *Alismaceæ* (*A. ranunculoides* always grows in water, though it often flowers after all the water has left it; this is the case with *Alismaceæ* in general), *Hydrocharidaceæ*. One species of *Polygonaceæ*, viz., *P. amphibium*, flowers on the land, though it grows in water, and also flowers in this element. One species of *Primulaceæ* (*Hottonia palustris*), part of *Lentibulaceæ* (the genus *Utricularia*), several species of *Scrophulariaceæ* (*Limosella aquatica*, and *Veronica* Bec. and V.

Anagallis). One species of *Gentianaceæ* (*Villarsia nymphaeoides*), 1 of *Campanulaceæ* (*Lobelia dort.*), 3 of *Compositæ* (*Aster* and *Bidens*, both species), 11 species of *Umbelliferae* (viz., *Oenanthe* 5, *Sium* 2, *Helosciadium* 3, *Cicuta* 1); 11 of *Haloragaceæ* and *Onagraceæ* (*Epilobium* 2), *Caulophyllaceæ* (*Stellaria* 2), *Cruciferae* (*Nasturtium* 2), *Nymphaeaceæ* (all the species), *Ranunculaceæ* (*Ranunculus* 4).

109. *Palustral* or Marsh Plants are such as grow in boggy places, exclusive of such as only grow where water has stood during winter, and which grow on firm grassy places, which are only occasionally flooded. Palustral or marsh plants grow where the situation is always more or less watery, having water above or just below the surface. The following are of this class, viz. :—

All the *Equiseta* except *E. arvense*. *E. Telmateia* and *E. hyemale* grow where the soil is more or less moist or close to water (for example, a bank under a hedge, with a watery ditch just underneath them). *Ophioglossum* often grows in marshy places, but it is not confined to such; yet it is scarcely found except where the situation is more or less moist. Several *Filices* grow in marshy places (for example, *Osmunda*). *Athyrium* (*Filix foem.*), all the varieties. *Nephrodium Thelypt.*, *N. cristat.* and varieties, are only found in boggy localities. Several species of *Gramineæ* (*Glyceria*, *Arundo*, 3—*Polypogon Alopecurus*, &c.), all the *Cyperaceæ*, except about a dozen of the *Carices*, two or three of the *Scirpi* and *Cyperi*, and such as have been entered as pure aquatics, all belong to this section; also *Juncaginaceæ*. Most of the *Juncaceæ* delight in watery or boggy spots. The *Luzulas* generally grow in damp shady places, boggy or otherwise. Several *orchidaceous* plants prefer boggy places (for example, *Orchis latifolia*, *Epipactis palustris*, and the two species of *Bog Orchis*). The *Orchids* usually prefer a dry soil. Most of the *Willows*, and several of the other *amentaceous* genera grow best in a moist or rather boggy soil (for example, the *Alder*, the *Sweet Gale*, and the *Common Poplar*). Several species of *Polygonaceæ*, especially of *Rumex* and *Polygonum*, prefer watery or rather boggy places. *Rumex mar.* and *R. palustris*, also *Polygonum hydropiper* and *P. minus*, are always found in or near to water. Of *Chenopodiaceæ*, some are only found in muddy places by the sea, as *Glasswort*. *Sea Plantain* and *Sea Lavender*, and *Thrift*, may be also reckoned among the marsh plants. In *Primulaceæ*, *P. farinosa*, *P. scotica*, all the species of *Lysimachia* except *L. nemorum* (which also grows occasionally in boggy places) *Anagallis tenella*, *Centunculus*, *Glaux*, and *Samolus*, are marsh plants. The *Pinguiculas* are all what are termed bog-plants. Of the *Labiatae*, the following grow in marshes or wet places—*Stachys palustris*, *Water Horehound*, and most of the *Mints*. Many of the order *Scrophulariaceæ* are found only in boggy places (for example, *Scroph. nodosa*, *S. aquatica*, and *S. vernalis*). The two former grow by river and ditch sides, and the latter usually, though not always, grows in wet hedges. Both species of *Pedicularis* are only found in bogs, especially *P. palustris*. *Veronica Beccabunga*, *V. Anagallis*, *V. scutellata*, and *V. serpyllifolia*, are only found in water

or in marshy places. The three former are almost confined to watery places, and the latter evinces a partiality for open drains by roadsides and similar places. Of *Boraginaceæ*, the marsh plants are the following: both species of *Symphytum*, *Myosotes* 3, *M. palustris*, *repens*, and *cæspitosa*. The beautiful *Bog-bean* (*Menyanthes trifoliata*) is a marsh or bog-plant. *Vaccinium uliginosum*, and *V. Oxycoccus*, are both found in rather boggy places, and the *cross-leaved Heath* (*Erica Tetralix*) prefers boggy, peaty places, though not strictly confined to such. *Wahlenbergia*, one of the *Campanulaceæ*, prefers wet or boggy places; but in the higher parts of St. Leonard's Forest, Sussex, it grows luxuriantly on dry friable mould.

*109. *Compositæ*.—The palustral plants of this large order are the following:—*Eupatorium* (Hemp Agrimony), *Inula crithmoides*, *Pulicaria vulg.*, *Gnaphalium uliginosum*, *Cineraria palustris*, *Senecio aquat.*, *S. palud.* and *S. Saracen.*, *Carduus palus.*, and *C. heterophyl.*, *Sonchus palustris*, *Hieracium prenanthoides*, &c.

Both the common *Valerians* are marsh plants, also *Galium palustre* and *G. uliginosum*.

110. *Umbelliferae*.—The following genera and species of this order are palustral, viz.:—*Hydrocotyle*, *Bupleurum tenuissimum*, *Angelica*, *Archangelica*, *Apium* (Celery), *Oenanthe*, all either aquatic or palustral, or both; *Peucedanum*, all the species but such as are aquatic; *Myrrhis*, river sides (Craven district, Yorkshire). Most of the *Saxifragæ* grow in moist places, or on wet, dripping rocks; the two common species, *S. granulata* and *S. tridactyl.* are exceptions. Both species of *Chrysosplenium* grow in watery or marshy places. *Montia fontana*, *Isnardia*, most of the species of *Epilobium* (all except *E. angustifol.* and *E. montan.*), grow in marshy spots. Both the *Lythraceæ* are confined to the vicinity of water. The palustral species of *Rosaceæ* are few, viz., *Spiræa Ulmaria*, *Geum rivale*. *Sanguisorba off.* prefers moist meadows, but it is not confined to them; it is found on the Surrey downs. Introduced? *Comarum*, *Rubus Chamæmorus* (Cloud-berry), are palustrals. *Leguminiferae* have still fewer examples in this section. *Lotus major* is usually palustral, and also *Lathyrus palustris*. Two or three species of St. John's-wort grow by water, or in watery places, viz., *H. quadrangulum* and *H. elodes*.

111. *Caryophyllaceæ*.—The following plants of this order are palustral: *Lychnis Flos-cuculi*, *Sagina nodosa*, *Stellaria glauca*, *S. scapigera* and *S. uliginosa*. *Malachium aquaticum*.—Several of these are often aquatic. All the *Droseras* are marsh plants. *Viola palustris* and *V. lactea* are found in marshy places; the former always, the latter usually.

112. *Cruciferae*.—All the species of *Nasturtium*, except such as are aquatic. *Cardamine*, all except *C. impatiens* and *C. sylvatica*. *Brassica napus* prefers the vicinity of water. *Scurvy grass* (*Cochlearia*) grows in wet or watery places, either by the sea-shore or tidal rivers, or on elevated mountainous places. *Meadow Rue* (*Thalictrum flavum*), *Trollius*, and a few species of *Ranunculus*, are palustrals. About a fifth of the British flowering plants belongs to this section.

113. *Littoral*, or Sea-shore Plants.—Several of these have been

already noticed under the two preceding divisions of aquatic and palustral plants; and in order to give a continuous view of our maritime vegetation, it will be necessary to mention such a second time. This will also occur in noticing the alpine and sub-alpine plants.

114. *Filices*.—The following plants of this order are littoral, viz., *Adiantum Cap. Ven.*, *Asplenium marinum*. *Gramineæ*, *Rottboellia* (*Lep-
turus incurvatus*), *Hordeum maritimum*, *Elymus geniculatus* (not found of late years), *E. arenarius*, *Triticum junceum*, *T. laxum*, *Sclerochloa mar.*, *S. distans*, *S. Bor.*, *S. procumbens*, *S. loliacea*, *Corynephorus canescens*, *Spartina* (both species), *Psamma*, *Polypogon* (both species), *Alopecurus bulbosus*, *Carex incurva*, *C. divisa*, *C. teretiuscula*, *C. extensa*, *C. punctata*, *C. distans*; *Scirpus mar.*, *S. Savii*, and *S. Holoschenus*. *Zosteraceæ*, and part of *Potamaceæ*, are maritime plants, viz., the *Ruppias*, *Triglochin mar.*, *Juncus mar.*, *J. acutus*, *J. balticus*, &c. *Asparagus off.*, *Euphorbia portlandica*, *E. Paralius*, *Hippophaiæ rham.*, *Polygonum mar.*, *Atriplex rosea*, *A. laciniata*, *A. litt.* and *A. mar.*, *Salicornia herb.* and *S. radicans*, *Beta mar.* and the 3 *Salsolas*, *Plantago mar.* All the species of *Statice* and *Armeria*; *Glaux mar.*, *Steenhammera mar.* *Convolvulus Soldanella*, *Erythræa*, all except *E. Cen.*; *Compositæ*, *Aster Trip.*, *Inula crith.*, *Diotis mar.*, *Pyrethrum mar.*, *Artemisia mar.*, *Chrysocoma*. Of *Umbelliferæ*, the following, viz., *Eryngium mar.*, *Bupleurum aristatum*, and *B. tenuiss.* *Ligusticum*, *Crithmum*, *Peucedanum off.* *Oenanthe Lach.*, *Fœniculum*, *Daucus mar.*, *Echinophora*. *Paronychiaceæ*, *Corrigiola*, and *Polycarpon*. Of *Leguminiferæ*, *Trifolium stellatum*, *T. marit.*, *Lathyrus marit.* Of *Geraniaceæ*, *Geranium mar.* Of *Malvaceæ*, *Lavatera arb.*, *Althæa off.* Of *Caryophyllaceæ*, *Arenaria pep.*, *A. mar.*, *Sagina mar.*, *Silene mar.*, both species of *Frankenia*, *Tamarix*. Of *Cruciferæ*, the following: *Sea Stock* (*Matthiola*—both species), *Sinapis monensis*, *S. Cheiranthus*, *Königa mar.*, *Cochlearia* (all the species), *Lepidium rud.*, *Cakile*, *Crambe*, *Raphanus mar.* *Glaucium luteum* is also maritime.

The Littoral plants constitute about one-fifteenth of the British Flora.

115. *Pascual Plants*.—Pascual, from *pascua*, pasture, denoting upland pastures or grassy tracts, pastured by cattle, not generally mown as meadows. The latter term differs from pasture, being usually in vales, and mostly contiguous to larger or smaller streams. These bottom lands may also be pastured, but they are generally mown. There are many plants common to both pastures and to meadows. Meadow or *pratal* plants may grow in pastures, probably most of them do; but there are pascual plants which never grow in meadows. The following are the principal pascual plants, exclusive of such as usually grow in woods, hedges, heaths, commons, or on rocks, or by the margins of upland or mountain rills. The principal herbage of pastures are the following Grasses:—*Brachypodium pin.*; *Lolium per.*; several *Festucas*, such as *F. ovina*, *F. duriuscula*, *Cynosurus cristatus*; many species of *Poa*, *Triodia Kœleria*, *Avena pubescens*, and *A. pratensis*; about four *Airæ*, as many

Agrostides (Bents), *Sesleria*, *Holcus*, *Alopecurus*, *Phleum*, and *Anthoxanthum*. The *Cyperaceæ* supply a very limited number of plants to the upland grazing tracts. *Carex præcox*, *C. montana*, and *Scirpus cæspitosus*, are the only plants of this order that grow in dry uplands; and the latter, perhaps all the three, are ericetal rather than pascual plants. *Juncus squarrosus* is found in all upland pastures, except where the soil is chalky or calcareous; but it may be called an ericetal rather than a pascual plant. *Luzula campestris* is a common plant in all pastures. The pasture on limestone hills in the north would be covered with *Allium oleraceum*, were it not closely eaten by the sheep. *A. schænoprasum* abounds in such pastures. *Scilla autumnalis* is also a pascual plant. With some exceptions all the species of *Orchidaceæ* grow in pastures, viz., *O. mascula*, *O. fusca*, *O. militaris*, and *O. tephrosanthos*, *O. maculata*, *O. pyramidalis*, *O. hircina*. *Gymnadenia*, *Habenaria*, *Aceras*, *Herminium*, *Ophrys*, *Spiranthes*, &c., are also pascual. It is by no means to be inferred that all these orchidaceous plants are confined to open pastures. Most of them (in the south of England) prefer old chalk quarries, pits, banks about fields, woods, and similar places. *Thesium* is pascual; so are *Rumex pulcher*, *R. obtusifolius*, *R. acetosa*, and *R. Acetosella*. *Plantago media* and *P. lanceolata* prefer pastures. The Cowslip is rather a meadow than a pasture plant; but it grows sometimes in the latter. *Thyme* and *Marjoram* are pascual; the *Calaminthas* rather prefer dry, bushy, banky places; but some of them are found in pastures. *Veronica officinalis*, and occasionally *V. Chamædryas* grow on the upland turf, though the latter generally prefers banks in the lower grounds. The Eye bright (*Euphrasia*) is almost the only other plant of this order to be found in pastures. The following *Boraginææ* are pascual. *Lithospermum* off., *Myosotis collina*, and *M. versicolor*. The elegant and rare *Polemonium* (Jacob's ladder) adorns the limestone hills of Derbyshire and Yorkshire. *Centaury* (*Erythræa* Cen.) grows in moist places in upland pastures; also *Gentiana verna*, *G. campestris*, and *G. amarella*; also *Rampions* (*Phyteuma*), and *Sheep's Scabious* (*Jasione*), *Campanula rotundifolia*, and *C. glomerata*. Of *Compositæ*, the following; *Leontodon* (3 Species), *Hypochaeris rad.*, *Crepis virens*. Many *Hieracia*, *Cardui* (Thistles), *Cineraria*, *Erigeron*, *Solidago*, *Bellis* (Daisy), *Senecio*, *Achillea*, *Scabiosa*, *Columbaria*, *Asperula*, *Cynanchica*, *Galium* (several species). Many umbelliferous species and genera, as *Daucus car.* *Heracleum*, *Meum atham.*, *Libanotis*, *Pimpinella sax.*, *Carum*, *Bunium*, *Trinia*, *Saxifraga gran.*, *Sedum villosum*, *Epilobium montanum*, *Potentilla argentea*, *P. verna*, *P. alpestris*, *Alchemilla vulg.*, *Poterium sang.*, *Spiræa Filipen.* *Leguminiferaæ*, the following: *Genista tinc.* *Ononis*, *Medicago*, *Trifolium* (many species), *Lotus*, *Anthyllis*, *Oxytropis*, *Vicia*, *Lathyrus*, *Hippocrepis*, *Onobrychis*, *Ornithopus*, *Linum* (all the species except *L. usitatissimum*), *Geranium sylvaticum*, *G. pratense*, *G. pyrenaicum*, *G. sanguineum*, *Hypericum humifusum*, *Cerastium* (nearly all the species), *Dianthus delt.*, and *D. cæsius*, *Silene inflata*, *Sagina*, *Arenaria*, *Polygala vulg.*, *Viola hirta*, *V. sylvat.*, *V. lutea*, *Helianthemum* (all the species). Scarcely any cruciferous plants

are pascual. *Actæa*, *Trollius*, *Ranunculus* (several species), *Anemone Pulsatilla*, *Thalictrum minus*, &c. By a rough calculation the pascual plants comprise nearly one-seventh of the British flowering species.

116. *Sylvestral plants*.—These grow chiefly in woods; but some of them also in hedges, and more in bushy places. Several of them have been already noticed as marsh or pasture plants. *Equisetum sylv.*, *E. hyemale*, *E. Telmateia*, &c. FILICES—*Pteris aquil.*, *Athyrium*, *Nephrodium Filix-mas.*, &c., *Polystichum aculeatum*, *Cistopteris fragilis*, *Polypodium*, GRAMINEÆ *Hordeum sylvat.*, *Brachypod. sylv.*, *Bromus asper.*, *B. giganteus*, *Festuca sylv.*, *Poa nemoralis*, &c., *Melica* (both species), *Aira cæsp.*, *Arundo Epigejos?* *Milium*. Of CYP~~R~~ACEÆ, &c., *Scirpus sylvat.*, *Carex depauperata*, *C. sylvat.*, *C. strigosa*, *C. pendula*, *C. Pseudo-cyperus*, *C. digitata*, &c. *Luzula sylv.*, *L. pilosa* and *L. Forsteri*, *Agraphis nutans* (Blue Bell), *Allium ursinum*, *A. scorodoprasmum*, *Tulipa sylvestris*, *Lilium Martagon*, *Convallaria* (all the species), *Maianthemum*, *Ruscus*, *Iris fetid.*, *Epipactis*, *Cephalanthera*, *Corallorhiza*, *Neottia*, *Listera ovata*, *Goodyera*, *Habenaria*, *Orchis*, many species, and most of the *Ophrydes*, *Paris*, and *Tamus*.

Most arboreous plants are sylvestral, except the cultivated Osiers, fruit trees, and a few trees about homesteads, such as the *Sycamore*; also *Euphorbia stricta*, *E. amygdaloides*, *E. Lathyris*, &c., *Mercurialis per.*, *Daphne* (both species), *Primula vulg.*, *P. elatior*, *Lysimachia nemorum*, *Trientalis*. Of LABIATÆ, *Calamintha sylv.*, *C. Clinopod.*, *C. Nepeta*, *Melittis Melissophyllum*, *Galeopsis Tetrakit.*, *Stachys Betonica*, *S. sylvatica*, *Teucrium Scorodonia*, *Ajuga reptans*. Of SCROPHULARIACEÆ, &c., Foxglove, Figwort, *Melampyrum* (all the species, except *M. arvense*), *Veronica mon.*, *V. of.*; also *Lathræa*, *Pulmonaria* (both species), *Lithospermum purpureo-cæruleum*, *Myosotis sylv.*, *M. arvensis* or *intermedia*, *Erythræa Cent.*, *Vinca* (both species), *Ligustrum*, *Pyrola* (all the species), *Bilberry*, *Monotropa*, *Campanula* (all the species except *C. glomerata* and *C. patula*), *Wahlenbergia*, *Phyteuma spicat.* Of COMPOSITÆ, *Solidago*, *Inula Conyza.*, *Achillea Ptarmica*, *Gnaphalium sylv.*, *Centaurea nigra*, *Carduus tuber.*, and *C. heterophyl.*, *Serratula tinct.*, *Crepis succissæfol.*, *C. paludosa*, *Hieracium* (many species). CAPRIFOLIACEÆ and LORANTHACEÆ (almost all the species); also *Rubia per.*, *Asperula odor.* Of UMBELLIFERÆ, *Wood Sanicle*, *Wild Angelica*, *Cow Parsnep*, *Anthriscus sylv.*, *Cherophyllum temulum*, *Bunium flex.* Of GROSSULACEÆ, most of the species grow in elevated woody places; also *Circæa* (both species), *Epilobium angustifol.*, *Prunus*, *Pyrus*, *Rubus*, *Rosa*, &c., *Fragaria* (both species), *Geum*, *Euonymus*, *Rhamnus*. Of LEGUMINIFERÆ, &c., *Astragalus hypoglot.*, *A. Glycyphyllus*, *Vicia sylv.*, *V. Orobus*, *Lathyrus sylv.*, *L. latifol.*, *Orobus tuberos.*, *O. niger*; also *Oxalis Acetosel.*, *Geranium pratense*, *G. sylvaticum*, *G. Phæum*, *G. nodosum?* *Hypericum hirsutum*, *H. Androsæmum*, *H. calycinum*. Of CARYOPHYLLACEÆ, *Melandrium diurnum*, *Arenaria trinervis*, *Stellaria nemorum*, *S. Holostea*, *S. graminea*. Several *Violets* grow in woods or woody places. Of CRUCIFERÆ, *Dentaria*, *Cardamine amara* (only in boggy parts), *C. sylvatica*. RANUNCULACEÆ, *Helleborus vir.*, *H. fetid.*, *Eranthis hyem.*, *Trollius*, *Aquilegia vulg.*; also *Ranunculus auric.*,

Ficaria, &c. Above one-fifth of the British species are woodland plants.

117. *Septal* and *Dumetal* plants, or such as grow in hedges on bushy open places, are not numerous, most of them being also found in woods.

118. Several of the *Horse-tails* and *Ferns* grow under hedges; most of the species of both these orders growing in woods will also be found about hedges. *N. Filix-mas.*, *A. Filix-femina*, *Polystichum*, *Scolopendrium*, *Asplenium*, *Adiantum nig.* and *A. lanceolatum*, *Pteris aquilina*, *Polypodium vulgare*. Of GRAMINEÆ, *Triticum can.* and *T. repens*, *Brachypod. sylv.*, *Bromus asper* and *B. sterilis*, *Festuca gigantea*, *Arrhenatherum avenaceum*. Of CYPERACEÆ, *Carex remota*, *C. axillaris*, *C. muricata*, *C. divulsa*, *C. vulpina*, *C. pendula*, *C. Pseudocyperus*, and *Arum maculatum*.

119. Many of the *Orchids* grow on banks, near hedges, such as *Ophrys mus.*, *O. apifera*, *Orchis militaris*, *O. tephrosanthos*, &c. Many or most of the arboreous and shrubby plants grow in hedges as well as in woods. The *Primrose* and *Cowslip* are common under hedges in many localities. The following are generally septal plants, viz., *Cynoglossum* (both species), *Anchusa sempervirens*, *Calamintha Nepeta*, *C. off.* and *C. Clinopodium*, *Ballota nigra*, *Leonurus Card.*, *Stachys sylvatica*. Of SCROPHULARIACEÆ, the following are septals:—*Verbascum Thapsus*, *V. Lychnitis*, *V. nigrum*, &c., *Veronica Chamædrys*, *Scrophularia nodosa*, &c., *Digitalis*, *Linaria vulg.* Of SOLANACEÆ, &c., *Hyoscyamus*, *Solanum dulc.*, *Atropa*, *Convolvulus sepium*, *Vinca maj.*, *V. minor*, *Campanula Trach.*, *C. latifol.*, &c. Of COMPOSITÆ, *Helminthia echinoid.*, *Pulicaria dysenterica*, *Senecio sylv.*, *Eupatorium*, *Lactuca virosa*, *Hieracium boreale*, &c. Of RUBIACEÆ, &c., *Galium cruciatum*, *G. Mollugo*, *G. Aparine*, *Valeriana off.*, *Dipsacus sylv.*, *D. pilosus*. Of UMBELLIFERÆ, *Conium*, *Sison Anomum*, *Ægopodium*, *Pimpinella magna*, *Angelica sylv.*, *Pastinaca*, *Heracleum*, *Torilis Anthriscus*, *Anthriscus sylves.*, *Chærophylllum temulentum*. All of the orders CAPRIFOLIACEÆ, CORNACEÆ, ARALIACEÆ, GROSSULACEÆ, BERBERACEÆ; also *Bryonia dioica*. Of ROSACEÆ, *Rosa*, *Rubus*, *Prunus*, *Geum urbanum*, *Potentilla reptans*, *P. fragariastrum*. Of LEGUMINIFERÆ, *Vicia Cracca*, *V. sepium*, *Lathyrus sylvestris*; also *Geranium robertianum*, *G. lucidum*, *G. rotundifolium*, *Malva moschata*. Of CARYOPHYLLACEÆ, *Saponaria off.*, *Cucubalus baccifer*, *Melandrium diurnum*, *Arenaria trinervis*, *Stellaria Holostea*; also *Viola canina?* *sylvatica?* *Clematis Vitalba*, &c.

120. *Dumetal* plants, viz., such as commonly grow in bushy, open, dry places, are the following:—Several *Filices*, *Gramineæ*, and *Cyperaceæ*, already noticed, as growing in woods; some *Orchids*, as *Habenaria bifolia?* *Orchis maculata*, &c.; *Plantago Coronopus*, *Lithospermum off.*, *Stachys Betonica*, *Orobanche elatior*, &c., *Veronica off.*, *Campanula rotundifol.*, *Anthemis nobilis*, *Filago ger.*, *F. minima*, *Carduus acaulis*, *Carlina vulg.*, *Hieracium Pilosel.*, *Leontodon autum.*, *Pimpinella saxif.* Many *Brambles* and *Roses*, and *Leguminous* plants, *Hypericum perforat.*, *H. elegans*, &c., *Helianthemum vulg.*, *Polygala vulg.*, *Viola sylv.*, &c.

121. *Ericetal Plants* are those that grow on peaty soil, either dry or moist. The great body of these has been noticed already as marsh plants. The number of species growing on dry heaths is very small, but the individual plants are very numerous. They are mostly gregarious, and exclude almost every other plant from the situations where they grow.

122. *Common Ling* (*Calluna*) occupies immense tracts of elevated land, where the soil is more or less composed of grit or sand, covered slightly, and sometimes deeply, with peat. Here the *Ling* predominates, mixed in the northern parts of the island with the *Crowberry* shrub, *Cloudberry*, &c., and with the other two common heaths, *Erica cinerea* and *E. Tetralix*, with here and there tufts of *Mat-grass* (*Nardus*) and *Mellic-grass* interspersed. A straggling *Tormentil*, a *Milkwort*, *Petty whin*, *Genista anglica*, and a few *Sedges*, are the only plants that modify the melancholy aspect of these wide desolate moors, hills, or mountains. Most of the other ericetal plants have been already noticed as palustral plants; there are, however, several which are only found on boggy heaths, viz.—*Carex dioica*, *C. pulicaris*, *C. stellulata*, *C. limosa*, *C. pilulifera*, &c.; also the *Bog Orchises*, *Sweet Gale*, *Pinguicula*, and *Utricularia*, *Wild Rosemary* (*Andromeda*) *Bog Whortleberry*, *Cranberry*, &c. The *Droseras* and some *Saxifrages* are also denizens of heathy, peaty bogs.

123. The *agrarial* and *viatical* plants grow only in cultivated fields, or by road sides, or in lanes by homesteads, or on rubbish and manure. They are mostly, but not all, annual; and though many of them can and do commonly grow in any of these habitats indifferently, several of them are found only in their peculiar situations.

124. *Agrarial* plants are not all annual; for example, *Equisetum arvense*, a common pest in poor moist land, is perennial, and creeps widely by its roots or underground stems. Of Grasses, many grow in tilled ground, and are very injurious; for example, *Couch* of various kinds. *Triticum* and *Holcus*, (for these grasses become couch or creeping-rooted grass in light soils), *Hordeum marit.*, *Lolium temulentum*, *Bromus* (several species), *Poa annua*, *Avena* (several species), *Arrhenatherum*, *Holcus*, *Apera*, *Alopecurus agrestis* (one of the worst weeds in Essex), *Phleum*, *Phalaris*, *Setaria*, &c. The CYPERACEÆ, JUNCACEÆ, and other marsh plants, are not troublesome in tilled ground. Drainage and breaking the surface speedily destroy them.

125. *Allium vineale* is a bad weed in fields, and *Epipactis latifolia*, though comparatively a rare plant, abounds in some corn fields in the South of England. One of the Nettles (*U. urens*) is common in fields; the only other common one is equally abundant about their fences. The annual *Spurges* are all more or less common in fields, and in some places the annual *Mercury*. About eight species of the genus *Polygonum* are agrarial, besides *P. amphibium*, which is rather too common in fields contiguous to water where it grows. Fields are infested with several species of *Dock*, which are almost all perennial.

The next order, CHENOPODIACEÆ, is purely agrarial, and all the

plants are annual with but few exceptions, and all are weeds with the exception of the salt-marsh plants; and some of them, as Sea-beet, become weeds in the adjoining fields. *Anagallis arvensis* is the sole weed of its order. LABIATÆ form a great proportion of our troublesome field and garden weeds, both perennials and annuals; for example, *Corn Mint* (*Mentha arvensis*), *Wild Basil* (*Calamintha Acinos*), *Ground Ivy*. All the common species of *Lamium* seed freely, and are always in flower; and, excepting *L. album*, they are all weeds. The genus *Galeopsis* is a genus of field weeds exclusively; also part of *Stachys* and *Ajuga*. The order SCROPHULARIACEÆ is abundant in weeds; for example, *Antirrhinum Orontium*, *Linaria*, *Elatine*, *L. spuria*, *L. minor*, besides *L. vulgaris*, *L. repens* (two perennials), *Melampyrum arvense* (rare), *Rhinanthus major*, *Bartsia Odon*; and seven *Veronicas*. The curious *Orobanches* are in many instances weeds; *O. minor* is a very common one; most of them are very rare. *Solanum nigrum* is a common weed; *Datura Stramonium* is too rare to be considered as an intruder. *Lycopsis*, *Echium*, *Lithospermum arvense*, and *Myosotis* (one or two species), are all the weeds belonging to the order *Boraginaceæ*. *Convolvulus arvensis* is a weed most difficult of extirpation; its roots are exceedingly long, and easily broken in pulling them out of the ground. *Specularia* is not very common, nor very troublesome where it grows.

The large order COMPOSITÆ supplies a large proportion of our weeds, both annual and perennial. *Tussilago Petasites* is not very troublesome; it keeps near the water. *Erigeron canadensis*, not noticed as found in Britain by our earlier botanists, has overrun a great extent of arable land in different parts, especially near large towns. *Anthemis arvensis*, and *A. Cotula*, *Chrysanthemum segetum*, *Pyrethrum*, three species. The *Filagos* are all weeds, and so is the whole genus *Senecio*, with two or three exceptions. *Centaurea* infests both the field and meadow, and the *Thistles* are too well known for their noxious properties. *Lapsana*, *Cichorium*, *Hypochaeris*, *Leontodon*, *Crepis* and *Sonchus*, contribute hosts of plagues to the agriculturist. *Helminthia echioïdes* is a frequent weed on stiff, clayey banks.

126. *Knautia arv.*, and all the *Fedias*, are weeds; but they are not serious impediments to agriculture. Two or three of the *Galiums* grow in corn-fields, viz.—*G. Aparine*, *G. tricornis*, and *G. anglicum*; but they are rare in most places, except the first-mentioned, which is chiefly found in hedges. *Sherardia arvensis* is another harmless weed.

UMBELLIFERÆ. Many entire genera of this order are field weeds, viz.—*Petroselinum segetum*, which is only found on the chalk marl, and sometimes disappears for years. *Ægopodium* is a creeping-rooted plant very difficult to extirpate; it grows only near homesteads, about gardens, rich fields, &c. *Bunium flex.* is so abundant in light soils that they are quite white with its flowers in the month of June; *Bupleurum rotundifol.* only in cretaceous or calcareous soils. *Æthusa* is frequent in fields and gardens. *Daucus* is a bad weed on chalky uplands. *Caucalis* is a weed in chalky fields, and *Torilis*

infesta and *nodosa* in almost all soils. *Scandix* and *Anthriscus vulgaris* are not very troublesome weeds. *Coriander* is rarely found. *Scleranthus an.* and *S. perennis* are the only common weeds of their order, and the latter is found but sparingly. *Potentilla anserina* and *Alchemella arv.* are the only weeds of the *Rosaceous* order. The Leguminous order supplies our fields with a few plants usually accounted weeds, but they are not very noxious, viz.—*Ononis*, *Vicia hirsuta* and *V. tetrasperma*. *Vicia sepium* is not generally accounted a weed, and the meadow Vetchling (*Lathyrus prat.*) is part of the herbage, as are also the common Medicks and Trefoils. *Viola arvensis*, or *tricolor*, is a weed in most fields and gardens. The whole of the Geraniaceæ are weeds, excepting the perennials, such as *Ger. sylvat.* and *G. pratensis*. The graziers of the West Riding of Yorkshire consider the former a weed. It is as common in their upland meadows and pastures as the great white Ox-eye Daisy is in the meadows of Middlesex. *Erodium mosch.* may also be excepted. *Oxalis stricta* is indeed a weed, but very sparingly distributed. In the order CARYOPHYLLACEÆ the weeds are numerous. Most of the annual *Silenes* are of this class; but they are far from common. *S. anglica* is plentiful in light sandy fields in Surrey, and *S. noctiflora* in the Eastern Midland Counties. Corn Cockle, *Lychnis Githago*, found its way to Scotland among seed-wheat, and reached the northern parts, only within the last forty years. *L. vespertina* is common on Summer fallows. *Spergula* is a bad weed on poor sandy ground. *Arenaria tenuifolia* grows on chalky soil; *Stellaria media* (common Chickweed) everywhere; also the common *Cerastia*. CRUCIFERÆ abound in weeds, and, though annual, hard to be extirpated; for example, *Common Charlock* (*Sinapis arv.*); and the other Mustards, though not so common as this species, are abundant in many places. *Flaxweed* (*Sisymbrium Sophia*) is too scarce to be troublesome. This may be said of *Treacle Mustard* (*E. cheiranthoides*), *Thlaspi arvense* and *Iberis amara*; but in dry, gravelly places, *Lepidium campestre* is a troublesome weed. *Raphanus* (Radish), and *Swines' Cress* are not very abundant in fields, and the *Shepherd's Purse* is mostly confined to road sides, walls, rubbish heaps, and waste places. *Isatis tinctoria* is barely a weed in some fields. *Nasturtium sylvestre*, *Sisymb. off.*, *S. Irio* are annual weeds; the two former confined to roadsides, rubbish, &c.; the latter is very rare. The FUMARIACEÆ are all weeds, with the exception of the species of *Corydalis* (suspected aliens).

With the exception of *Celandine* (*Chelidonium*), *Yellow-horned Poppy* (*Glaucium*), *Welsh Poppy* (*Meconopsis cam.*), all the Poppies are weeds; one or two of them very common. In some parts of England (Kent, Cambridgeshire, &c.) *Larkspur* and *Pheasant's Eye* are abundant in corn fields. *Myosurus minima* is a very local weed, and the *Ranunculi* are weeds everywhere; the annual sorts in corn fields, the perennials in meadows and pastures. The aquatic and palustral species are the only exceptions. The exact number of annuals, or of plants so called, is 298 or 300 in round numbers, about one-fifth of the number of British species. The Biennials, or plants so

called, are above 50 and under 60. The number of annuals that grow in tilled ground, or on rubbish, and in waste places, is 198. The rest of the annuals grow either on the sea shore, or on heaths or commons, or by roadsides, or on walls, rocks, &c., and are in no way injurious to agriculture. About 15 of the reputed biennials are weeds which grow among crops, and are more or less injurious to them. Of perennials there are about 40 injurious to agricultural operations, or to grazing and meadow lands. Consequently, between 240 and 250 plants are to be considered as weeds.

127. *Viatical* plants are such as grow near human habitations, and many of them seem to accompany man in all his migrations. When a clearing in a forest has been made, or even when a portion of a common has been enclosed and a homestead erected, multitudes of these Viatical or domestical plants spring up everywhere in the vicinity. Numerous Grasses, besides the *Annual Poa*, which is generally diffused, such as *Bromus sterilis*, *Triticum repens*, *Festuca gigantea*, &c. Polygonum and Rumex abound in such localities, especially *P. lapathifol.*, *P. Persicaria*, *P. Aviculare*, &c., *Rumex obtusifol.*, *R. Acetosella*, and the like. Chenopods also appear, especially *C. album* and *Atriplex patula*. *Chenopod. Bonus Hen.*, is rarely found but in waste places near farm-yards. Several plants have the brand of *alienism* marked upon them; in some cases certainly for no other reason but because they associate with man, and find in his vicinity the medium necessary for their existence. *Borago officinalis* is never found but in a highly nitrogenised soil. This plant occupies the same situations on the continent as it does here. In France it is recorded as "cultivé dans les jardins; frequemment subspontané dans le voisinage des habitations." In Germany, "In hortis colitur, ibique et in ruderatis atque hortorum rejectamentis quasi sponte provenit." *Plantago major* is also a viatical plant, which appears to thrive better for being constantly trodden upon. The *Lamiums*, *Ground Ivy*, *Horehound*, both black and white, and *Vervain*, are principally or entirely viatical. *Carduus tenuiflorus*, also *Onopordum Acanthium* and *Silybum marianum* are confined to places near towns, villages, dwellings, &c., and they grow in similar localities on the continent. *Pyrethrum Parthenium* (a suspected alien), *Ægopodium Podagraria*, *Malva rotundifolia*, *M. sylvestris*, *Cerastium triviale*, and *C. glomeratum*, *Stellaria media*, *Capsella*, *Coronopus Ruellii*, *Chelidonium major*, *Meconopsis cam.*, *Ranunculus repens*.

128. *Rupestral* plants are divisible into two groups, viz.—such as grow on rocks of but little elevation above the level of the sea, and such as grow on mountainous or alpine rocks. The following are the most important rupestral plants of the first group:—*Hymenophyllum Tunbridgense*, *Adiantum Cap. Ven.*, *Cystopteris frag.* All the species of *Asplenium*, except *A. Septentrionale*, *A. germanicum* and *A. viride*. (*Ceterach off.*), grows on walls near the sea, and also on mountainous rocks. *Inula crithmoides*, *Crithmum marit.*, *Chrysocoma Linosyris*, *Sea stock* (both species), *Arabis stricta*, *A. hirsuta*, *A. ciliata*, *Brassica Oleracea*, *Raphanus marit.*, *Cakile*, *Crambe* (also on the shore),

Hutchinsia, *Silene nutans*, *Lychn. visc.*? With these may be united mural plants, such as grow on walls; the following are the chief:—*Dianthus plum.*, *D. Caryoph.*, *D. cæsius*? *Spergula sub.*, *Arenaria serpyll.*, *Cerastium triviale*, *Antirrhinum majus*, *Linaria purpurea*, *Echium vulgare*, *Sedum acre*, *S. album*, *S. dasyphyllum*, *S. acre*, *S. rupestre*, *Cotyledon Umbil.*

129. The following species are *Alpine* or *Sub-alpine rupestrals*, viz. —*Hymenophyllum Wilsoni*, *Asplenium vir.*, *A. sept.*, and *A. germanicum*, *Ceterach* off., *Polystichum Lonchitis*, *Cystopteris frag.* and varieties; *Allosorus crispus*, sometimes on rocks. The orders COMPOSITÆ, SAXIFRAGACEÆ, ROSACEÆ, CARYOPHYLLACEÆ, CRUCIFERÆ, and RANUNCULACEÆ, contribute the greatest portion of the rupestral plants, viz.—*Erigeron alpinus*, *Gnaphalium sup.*, *Saussurea alp.*, *Hieracium* (numerous species.) *Saxifraga stellaris*, *S. hypnoides*, *S. oppositifol.*, *S. nivalis*, *S. hirta*, &c., *Sedum Forsterianum*, *S. Rhodiola*, *Potentilla rupestris*, *P. tridentata*, *Silene acaulis*, *Arenaria fasti.*, *Lychnis alp.*, &c., *Arabis petraea*, *Draba rupestris*, *D. incana*, *D. muralis*, *Cochlearia* off., &c., *Ranunculus alpestris*, *Thalictrum minus*. The alpine rock-plants may be roughly estimated at 80. Several plants that usually grow on the sea-shore are found among alpine rupestral plants, or alpine plants generally; for example:—*Plantago maritima*, *Armeria mar.*, *Cochlearia* off., and its varieties, *Silene nutans*, &c. In addition to these plants that are only littoral and alpestral, or semi-alpestral, there are a great many found on or near the coast level, which are found from the coast line as far as 3000 feet, or higher. *Orchis mascula* ascends to about 1600 feet, *Habenaria albidia* reaches the altitude of 1800 feet, *H. viridis* 2550, and *Orchis maculata* 3000 feet. *Rumex acetosa* ascends to the alpine elevation of 4000 feet. These and many other plants are capable of growing at any elevation, even under the perpetual snow-line, provided they find soil and situation suitable; or, in other terms, exist in a mean annual temperature varying from 51° to 44°. Their horizontal range may be equally well described by the temperature which they are capable of bearing, which is from 51° or 52° to 45° or 44° Fahr. Although, as has been already stated, the flowering of plants and maturation of seeds depend more on the average temperature of the spring and summer months than on the annual temperature.

HORIZONTAL AREA AND ALTITUDINAL RANGE OF THE BRITISH PLANTS.

It has been already stated, and fully illustrated, that all plants, spontaneously growing in any extensive tract, territory, or country, are not found in every part of such country or tract. Some are confined to rocky places, either alpine, campestral, or littoral; some grow only in woods or hedges, some in boggy and watery places, some in pastures, and some in fields. There are some plants that are not limited to particular habitats, but appear to grow in all sorts of localities,

with little decided preference for any particular one. These constitute but a very small proportion of the plants of any country or district. There are others which are common in some one, or in several, of the habitats which every extensive tract possesses. Those plants, such as *Poa annua*, *Stellaria Holostea*, and a few others which do not manifest any very decided preference for moist or dry, shady or exposed situations, and such other common plants as are usually found in every district, though manifesting preferences for peculiar habitats, and being also common in all districts of large tracts or kingdoms, are, on a rough estimate, about one-third of the plants growing spontaneously in such large tract or kingdom. Estimating the number of the phænogamous species of plants in Britain at between 1400 and 1500, about one-third, or between 400 and 500, will be commonly found in any county, parish, or smaller area, if the necessary conditions of moistness, dryness, shade, soil, &c., be present. It is to be borne in mind that the plants here stated to be universally present over a whole country, and in every part of it, are the very common plants. Every district, whether of great or small extent, if the necessary conditions above stated be present, produces many plants that are not common, but rather rare, or very rare, both in the district and in the whole tract of country, the natural vegetation of which is under consideration. Again, some districts produce plants peculiar to a few districts; others produce plants limited to one district. The different aspect of the vegetation in two conterminous districts, whether counties or provinces, is unnoticed except by those observant of nature; but the difference in the appearance of the general vegetation in the south of England and in the north of Scotland cannot fail to strike even those who are least observant of nature's aspects. Only about one-third of the naturally-growing British plants are common both to the south of England, the north of Scotland, and to all the intermediate provinces, counties, or parishes where the necessary conditions of moisture, soil, shelter, &c., are present. The latitude of the extreme south of England is about 50° N., and the mean annual temperature is about 51° Fahr. The latitude of the extreme north of Scotland is between 59° and 60°, and including the isles, 61°, and the mean annual temperature is about 45° Fahr. The difference of latitude between the extreme points is 11°, and the difference or range of temperature 6°.

This difference in latitude and temperature, though not very considerable, has, in connexion with local circumstances, a considerable influence on the vegetable productions of both the northern and southern extremities. It has been stated that plants do not grow indifferently in all situations, soils, or habitats, though the whole surface of the ground is covered either with a few plants repeated, as *Grasses* and *Heaths*, or with a considerable variety of different sorts; yet the same plants are not found equally abundant in all situations or habitats, even in districts of limited extent. Temperature or latitude, though not so influential on the distribution of plants as soil, moisture, shade, and exposure, yet it affects the dissemination

and increase or permanency of plants. The horizontal area of plants will be extensive or otherwise in proportion to the alternations of temperature which the species can endure. It should also be considered that the range of mean annual temperature is far less important in promoting the spread and permanency of plants than the monthly averages of temperature are. The average temperature of the spring and summer months (*i. e.* from February to July inclusive), in the southern counties of England, is 56° - 57° Fahr., while that of the counties in the north of Scotland, during the same season is presumed to be 50° - 51° .* This difference affects the range of plants more than any other agent, except those above stated, *viz.*, soil, aspect, shade, moisture, &c. It will be subsequently shown, that some plants which grow in the southern counties, and on the shores of the English Channel, do not extend further north than 52° ; others fail at 54° , 56° , 58° , and so on.

The southern shores and counties of England produce about twice as many distinct species as are to be found in the northern counties and on the northern shores of Scotland. And the species common to both the extreme north and extreme south of the island are, as above stated, about one-third of its whole spontaneous growth. In the larger orders, this proportion, *viz.*, one-third, will be generally the proportion of species present belonging to the orders found in the south and in the north, and in all intermediate provinces or counties limited as above mentioned. The *Filices* and their allies, common to both the south and north of the British isles, are the following:—*Polypodium vulgare*, *Nephrodium Filix-mas.*, *N. Oreopteris*, *N. dilatatum*, *Athyrium Filix-fem.*, *Asplenium Trichomanes*, *A. Adiantum nigrum*, *A. Ruta muraria*, *Pteris aquilina*, *Blechnum boreale*, *Scolopendrium vulgare*, *Lycopodium Selago*, *L. clavatum*, *Equisetum Telmateia*, *E. arvense*, *E. palustre*, *E. limosum*, *E. sylvaticum*. These species are the most widely distributed, *i. e.* occupy the greatest horizontal area, and are the most common plants of the order to which they belong. They form about one third of the *Filices* and allied groups. About one third of the *Gramineæ* (Grasses) are generally distributed over the whole area of Great Britain, and are also the most common plants of their order. The following are examples, *viz.*:—*Anthoxanthum odoratum*, *Alopecurus pratensis*, *Phleum pratense*, *Agrostis vulgaris*, *Aira cæspitosa*, *Holcus lanatus*, *H. mollis*, *Poa annua*, *P. pratensis*, *P. trivialis*, *Dactylis glomerata*, *Cynosurus cristatus*, *Festuca ovina*, &c.; *Bromus mollis*, *Triticum repens*, *Lolium perenne*, &c. Of all the Grasses, these species have the most extensive geographical area, not only in the British isles, but they are also most extensively distributed over the whole continent of Europe.

The number of British grasses is about 130, or, including the doubtful species, about 140. The number of very common, and mostly

* These observations, though carried on for many years, give, as above stated, too high a result, *i. e.* the mean temperature of the day only being observed, it is probable that the average is too high.

widely-distributed grasses is about 45, or nearly one-third of the whole. The British *Cyperaceæ* amount to about 90; and the most extensively distributed and most common species amount to about 30. The number of British Orchids is 40; and about 10 of them are pretty generally distributed, and rather common. In this order the average number of common and widely spread species falls below the general average; but it is the only one of all the large orders in which this is the case. *Orchis mascula*, *O. maculata*, *O. latifolia*, *Gymnadenia conopsea*, *Listera ovata*, and *Epipactis latifolia*? are examples of the widely distributed species. In *Polygonaceæ* the number of very common and widely distributed species is above the average, being rather more than one-half of the whole. In *Boraginaceæ*, the number of the common species is just one-third of the whole, viz., 8 of the former to 24,—the number of British species in the order. These 8 occupy the greatest horizontal area, and comprise by far the largest amount of the individual plants. In *Labiata* and *Scrophulariaceæ*, the number of very common species is rather more than one-third of the whole number in the two orders respectively. In *Compositæ*, the number of very common and extensively distributed plants is rather under the average: the proportion is 46:140. This is the case in *Umbellifera*, the ratio being 19:62. In *Rosaceæ* the ratio is above, and in *Crucifera* it is below the average. In the three remaining large orders, viz., *Leguminifera*, *Caryophyllaceæ*, and *Ranunculaceæ*, the average of one-third is maintained.

These very common species, or about one-third of the British plants, are found in the south of England, and extend from lat. 50 to lat. 59 or 60. There are several which have a less extensive range, viz., are found on the south, but do not reach quite so far as the 60° N. lat. The following is a list of grasses which are abundant in the south of England, but do not reach so far north as 60°—61°, but which generally fail between 58° and 60°, viz.:—*Millium effusum*, *Avena pratensis*, *A. flavescens*, *Koeleria cristata*, *Melica uniflora*, *M. nutans*, *Glyceria aquatica*, *Poa nemoralis*, *Festuca bromoides*, *Bromus secalinus*, *B. commutatus*, *Triticum caninum*, *Lolium temulentum*. These 13 species are nowhere quite so general as the 45 species which are common to both the southern and northern shores. The next list contains the Grasses, which, though not common, are found in the south of England more or less abundantly in places, and reach to the latitude of 56°—57°:—

Phalaris Canariensis, *Arundo calamag.*, *Phleum arenarium*, *Alopecurus bulb.* and *A. agrestis*, *A. Spica ven.*, *Avena fatua*, *Sclerochloa distans*, *S. Boreri*, *S. procumbens*, *S. rigida*, *Poa compressa*, *Festuca sylvat.*, *F. gigant.*, *Bromus asper*, *B. sterilis*, *B. erectus*, *Brachypod. pin.*, *Hordeum mar.*, *H. pratense*, *H. sylvat.*, *H. maritimum*, *Lepturus incurvatus*. These species are all rare in the northern part of the island, i. e. on the northern side of the Tweed.

The following reach only as far as lat. 54°, viz., *Spartina stricta*, *S. alternifol.*, ? *Digitaria humifusa*, *D. sanguinalis*, *Setaria viridis*, *S. glauca*, *S. verticillata*, *Phleum asperum*, *P. Boehmeri*, *Alopecurus*

fulvus, *Gastridium lendigerum*, *Polypogon monspeli.*, *P. littoralis*, *Apera interrupta*, *Arundo stricta?* *Aira canescens*, *Poa bulbosa*, *Festuca unigl.*, *F. Pseudo Myurus*. The following are confined within two degrees, viz., 50°—52°. *Leersia oryzoides*, *Cynodon Dactylon*, *Knappia agrostidea*, *Agrostis setacea*, *Briza minor*, *Bromus madritensis*.

The number of grasses growing wild in the south of England is 107, viz., 45, which are distributed universally from south to north, and 62 which fail before reaching the extreme north. The following grasses are found between the extreme south and north of the island, neither reaching so high as 60°, nor approaching near lat. 50°, where the altitudes are inconsiderable, viz., *Poa alpina*, *P. cæsia*, *P. minor*, *P. laxa*, *P. Balfourii*, *Phleum alp.*, *Aira alp.*, *Sesleria cær.*, *Avena strigosa*. If the other large orders, viz., *Cyperaceæ*, *Compositæ*, *Umbelliferae*, *Leguminiferae*, *Cruciferae*, &c., were traced over their latitudinal area or distribution, similar results would be obtained, i. e. a certain proportion of each order would be found to disappear before reaching the extreme northern shores. As in the *Gramineæ*, so in these orders there are in each a few plants which, like *Carex rigida*, *Erigeron alpinus*, *Meum athamaticum*, *Astragalus alpinus*, and *Draba rupestris*, are found on lofty mountains towards the extreme north, but not reaching it, probably because the land is nowhere sufficiently elevated, or the proper rock or rock-soil may be wanting. From what has been already stated, it might be inferred, that the number of distinct species, growing between two parallels to the south of a given line, would be greater than the number growing between two equidistant parallels to the north of the given line. Let the parallel of 55½ be assumed as being nearly equally distant from both the northern and southern shores, and let the Grasses be taken as examples. The number of distinct grasses growing to the south of the said line is 107; the number growing to the north of the line is about 80, the decrease being about twenty-five per cent.; and at the same ratio the decrease on the whole number of British plants will be about 370, which will leave nearly 1200 species as the amount growing wild in Scotland; and this is probably a very close approximation to the truth.

In the order *Compositæ* the excess of species growing on the south of the assumed line is about twenty; and the difference is still more remarkable in such orders as have their maximum towards the south. For example, all the British species of *Umbelliferae* are found on the southern half of the island; while in the northern half the whole number is only about 40, or two-thirds of all the British species, and none of these peculiar to the northern parts of the island.

Of the order *Caryophyllaceæ* about six species are peculiar to the northern half of the island; still the numerical superiority is in the southern half. The whole number of British species is 55, of which the southern division produces about 50. Scarcely 49 pass into the northern division. This number, with the exclusive or peculiar species, leaves a majority of species to the south. About 35 species of *Cruciferae* belong to the northern division; only one or so being peculiar to it, while above 60 are found in the southern half.

The following is a list of species which grow exclusively in Scotland; some of them are found in Ireland. The genera, with the star prefixed, are not found in England. They are mostly alpine rupestral plants:—*Cistopteris montana*, *Polypodium alpestre*, *Aira alpina*, *Alopecurus alpinus*, *Poa laxa*, *Hierochloë*, *Carex rariflora*, *C. vaginata*, *C. saxatilis*, *C. aquatilis*, *C. Vahlîi*, *C. leporina*, *C. incurva*, *C. rupestris*, &c. Of *Juncus* there are 5 Scottish species; of *Luzula* 2; Orchids, **Corollorhiza* and **Goodyera*; *Salices* (10 species), *Primula scot.*, *Pinguicula* (2 species), *Ajuga pyram.*, *Veronica alpina*, *V. saxatilis*, *Myosotis alpestris*, *Gentiana nivalis*, *Pyrola* (2 species), **Arbutus* (2 species), **Azalea*, **Menziesia*, and **Dabœcia*, *Gnaphalium sup.*, *Hieracium* (10 species?) **Sonchus alp.*, **Sausurea*, *Galium* (4 species), *Saxifraga* (7 species), *Epilobium alp.*, *Alchemilla alp.*, *Potentilla opaca*, **Oxytropus ural.*, *Astragalus alp.*, *Cerastium latifol.*, *Arenaria rubella*, *A. fastigiata*, *Stellaria scapigera*, and *S. cerastoides*, *Lychnis alp.*, *L. viscaria*, *Silene acaulis*, *Draba rupestris*, *Arabis petræa* and *A. ciliata*.

The species, as above stated, vary in their latitudinal area; some extending from the extreme south to the utmost northern limit; others extending only a very few degrees. Several species of several orders are limited to Scotland, as the great bulk of the *Saxifragaceæ* is found there; but the preponderance of species is in the south; and the general law regulating the distribution of species may be expressed thus, viz., the higher the latitude the smaller the number of plants; and, *vice versâ*, the lower the latitude the higher the number of plants. This difference of latitude is not the real cause of difference in the vegetation; the real cause is the variation of temperature, which generally decreases with the increase of latitude. In round numbers, about 6° is the difference in the annual temperature between the north and the south of Britain.

It has also been stated, that the effect of the annual heat on vegetation is trifling when compared with that of the temperature of the spring and summer months. The following fact proves this:—In the centre and north of Germany, lat. 52°—56°, the Laurel cannot endure the rigorous cold of a German winter; it perishes unless protected. This occurs because the annual temperature is too low to admit of its existence in the open air. In the south of England the annual temperature is sufficiently high to permit the Myrtle, and even the Geranium, to live in the open air at all seasons of the year. Again, in Germany, the Vine ripens its grapes even in lat. 56°, because the summer temperature is high. In the British isles much tenderer plants than *Laurel* brave our winter's temperature, which is comparatively high, owing to our insular position; while, on the other hand, our summer heat is scarcely ever sufficient to mature the fruit of the Vine.

The vegetation of the eastern and western sides of Great Britain differs less in number than in species. The number on both sides is nearly equal; the preponderance is, however, on the eastern side. If a line be assumed about 1½° west of London, passing through

the western side of Hants, and cutting the counties of Oxford, Warwick, Derby, and York, and thence bending to the west, cutting the northern part of the island into two equal parts; on the eastern side of the line, about 110 plants will be found which are not found on the western, or rarely, or very rarely found; and on the western side of the assumed line, about 90 species will be found which are very scarce, or not to be found at all on the eastern side. The following species are a sample of the plants exclusively confined to the east, viz., *Adonis*, *Myosurus*, *Anemone Pulsatilla*, *Delphinium*, *Iberis*, *Lepidium latifolium*, *Dentaria*, *Sisymbrium Irio*, *Erysimum cheiranthoid.*, *Reseda lutea*, *Frankenia*, *Dianthus prolifer*, *Silene* (3 species), *Holosteum*, *Cerastium arvense*, *Linum perenne*, *Medicago falc.*, *M. denticulata*, *Trifol. ochroleuc.*, *Astragalus hypoglot.*, *Onobrychys sat.*, *Isnardia*, *Bunium bulbocast.*, and 9 other umbelliferous plants; several *Veronicas*, *Gramineæ*, and other monocotyledonous plants.

The following are some of the plants confined to the west, or occurring on the eastern side of the assumed line, rather as stragglers than established plants, viz.—*Aconitum Napellus*, *Meconopsis cam.*, *Coronopus didyma*, *Hutchinsia*, *Subularia*, *Draba aizoides*, *Arabis stricta*, *Matthiola sinuata*, *Sinapis monensis*, *Hypericum linariifolium*, *Trifolium Molinieri*, *T. Bocconi*, *Lotus angustifol.*, *L. hispidus*, *Cotoneaster vulg.*, *Corrigiola*, *Polycarpon*, *Sedum rupestre*, *S. Forsteri*, *Cotyledon*, *Physospermum cornub.*, and about six other umbelliferous plants. Several species of Filices are limited to, or more prevalent in, the west of England, viz., *Nephrod. Fœnisecii*, *Asplenium marinum*, *A. germanicum*, *Adiantum Cap. Ven.*, *Hymenophyllum Wilsoni*, *Cystopteris fragilis*, &c. There is scarcely a species of this order exclusively confined to the eastern parts of the British isles. Several Orchids and Grasses are peculiar to the east, as *Ophrys arachnites*, *Orchis hircina*, *O. militaris*, *O. tephrosanthos*, *Leersia oryz.*, *Digitaria humifusa*, *Setaria viridis*, *S. glauca*, and *S. verticillata*, *Phleum asperum* and *P. Bæhmeri*, *Polypogon monsp.*, *P. littoralis*, *Apera Spica venti*, *A. interrupta*, *Aira canescens*. The species of *Cruciferae* preponderate in the west, and the *Caryophyllaceæ* and *Umbelliferae* in the east.

One feature to be noted, in reference to those plants which are exclusively found on the eastern and western sides of the assumed line drawn through the island from south to north, is, that none of them are very plentiful; none of them have a wide or extensive area of distribution. Another feature is, that the exclusively eastern plants are mostly agrestal or agricultural weeds, such as *Veronica verna*, *V. triphyllos*, *V. Buxbaumii*. Several *Silenes*, as *S. noctiflora*, *S. conica*, *S. anglica*, *S. otites*, *Caucalis* (2 species), *Iberis*, *Delphinium*, *Myosurus*, and *Adonis*; while the exclusively western species are mostly perennials, or littoral or palustral annuals. The physical and artificial conditions of the east and west of this island account for this difference in the vegetation; these have more influence than the difference in the moisture of the atmosphere, which is considerable. The east of Great Britain is less uneven in surface than

the west is, and on this account is better adapted for tillage. It is also much less intersected by æstuaries and friths. The latter is generally mountainous, and consequently better suited for pasturage than tillage; and having a moister climate it is fitter for producing grass than for corn. On this account agricultural weeds are more abundant in the east than in the west, and several plants are peculiar to the west, because there they enjoy a milder and a moister atmosphere. These local plants have, however, but a slight effect on the general aspect of the country. On both the east and the west we find the gritty moors covered with Ling, intermixed with a few insignificant plants that only maintain a precarious existence. We find the same herbage in the meadows, and, with few exceptions, in the upland pastures. The limestone hills are clothed with green and succulent plants; the granitic, boggy hills with Heath, Goosegrass (*Juncus squar.*), and coarse sedgy plants. Where nature has been left in undisturbed possession of the surface, her aspect is uniform, except when altered by geological causes. Where human industry has been judiciously applied, the changes in the aspects of nature are great and important. The Essex marshes, the eastern Lowlands, the fens of Cambridge and adjoining shires, the sandy plains and rabbit-warrens of Norfolk, the table-land of Lincolnshire, extending from Lincoln to Barton Ferry, are all examples of the great and beneficial change effected by drainage, embankments, cultivation, &c.

It has been stated and proved that the most common plants have also the most extensive horizontal area; they are found spread over the largest extent of country, and are found in the greatest abundance everywhere, unless where restricted by want of proper soil, shelter, or the like. It is next to be shown that the same common plants which have the largest area have also the most extensive altitudinal range. The following species of *Ferns*, and their allies, have the greatest horizontal area, and their altitude is mostly considerable. *Polypodium vulgare* ascends from the coast-line to upwards of 2000 feet; *Nephrodium Filix-mas.*, from 0 (the coast-line) to 1500 feet; *N. Oreopteris*, from 0—2750 feet; *N. dilatatum*, from 0—3600 feet; *Asplenium Trichomanes*, 0—2100 feet; *Blechnum boreale*, 0—3900 feet. In the order *Gramineæ*, we find that species which have the largest horizontal area have also the greatest altitudinal range; for example, *Festuca ovina* and *F. duriuscula* grow from lat. 50° to 61°, and ascend from the coast-line to the altitudes of 4350 and 2550 feet respectively. *Poa annua* attains an altitude within a few hundred feet of the *Alpine* species of *Poa*. It reaches to 3300 feet, and the *Alpine* species barely reach to the height of 4000 feet; and these latter are not found at or near to the coast level. *Aira cæspitosa* is another example of an altitudinal range proportionate to its horizontal area. *Aira flexuosa* reaches to an altitude of 3900 feet. The grasses which are distributed over less extensive areas, viz., from the 50th to the 52nd, 54th, and 56th degrees of latitude respectively, are rarely found in situations exceeding 600 feet above the coast, and generally grow at altitudes less than 200 feet above the sea-line.

A comparison of the other more extensive genera and orders of British plants would exhibit the same results, and corroborate the same principle, viz., that the most common plants in any specific station have by far the longest latitudinal area and the greatest altitudinal range; or, in other terms, will occupy a larger horizontal space, and generally grow at any elevation, ascending from the sea-line to the altitude of several thousand feet.

These very common and widely-distributed plants are also the commonest and most extensively distributed plants of the European continent; while many of our scarce and restricted species are equally restricted and scarce in the continental parts of Europe which lie nearly under the same parallels.

There are, however, some anomalies or exceptions to the laws above stated, which have not yet been satisfactorily explained. There are species whose area is universal, and which are not restricted to particular soils and habitats; yet these are by no means common plants. *Polypodium Phegopteris* is rare in the middle and south of England, and is far from common in the north. It is rarer than *P. calcareum* or *P. Dryopteris* in the north-west of Yorkshire; and compared with *P. vulgare*, which has the same horizontal area and a considerably lower altitudinal range, it is very rare. *Osmunda regalis* is another species of a very extensive horizontal distribution, but is rarely found in great plenty. With the exception of these few localities where the Fern abounds, the examples of this plant are generally few, and these at great intervals, in comparison with other Ferns of no greater area or altitudinal range; as, for example, *Nephrodium Filix-mas.*, *Athyrium Filix-fœm.*, &c. *Botrychium* and *Ophioglossum* are sometimes overlooked, as being of small size, or concealed by larger plants, among which they are found; or they are eaten by sheep, or mown with the grass, and so escape notice. But after every allowance has been made, it is certain that they are not so common as *Pteris aquilina*, or *Blechnum boreale*, with both of which they agree in superficial area, and one of them only differs much in altitudinal range. *Schaenus nigricans* is also an exception to the general law: it occurs in considerable quantity where it grows; but the stations where it is found are not numerous. *Hippuris vulgaris* is another example: it is rare, but where it occurs it exists in plenty. *Parnassia palustris* is deficient chiefly in the southern counties: it is plentiful in the north. *Sedum Telephium* is another example of a rather scarce plant in several counties, although it has a general area and considerable altitudinal range. These are the chief exceptions to the general law. The other British plants of equal extent, either in area or range of altitude, confirm the law, that the greater the range of latitude or elevation of any given plant, the greater will be its general preponderance in any given district over other plants which have a more restricted range, and this excess will generally be in proportion to the greater or less restriction of the other species with which these general species are contrasted.

Few of these rare and restricted plants are of any real economical

value. Only a very few of them, like the Orchids and Pinks, are objects of curiosity and ornament. The great mass of them are weeds of one sort or another, and appear only in cultivated ground, where the climate has been ameliorated by cultivation. Most of them would disappear, if the surface of the ground were to be allowed to return to its original state. Almost all our really useful grazing and mowing grasses are such as are exceedingly common, and, it may be said, universally diffused; for example, *Festuca pratensis*, *F. ovina*, and *F. duriuscula*; *Dactylis glomerata*, *Cynosurus cristatus*, *Poa pratensis*, and *P. trivialis*; *Glyceria fluitans*, *Aira cæs.*, and *A. flexuosa*; *Agrostis can.*, and *A. vulgaris*. *Alopecurus pratensis*, *Phleum pratense*, *Anthoxanthum odoratum*, are our commonest and most useful grasses. They are found everywhere in greater abundance than any equal number of British grasses, and they have the widest and longest horizontal extent and the highest altitudinal range. *Lolium perenne* is almost the only valuable grazing or fodder grass, which, though generally distributed, and reaching to at least 1200 feet above the coast-line when cultivated, could not retain its hold of the soil without being renewed by seeds. When sown it endures for only two or three years in great quantity; after this time it is choked by other grasses, and finally disappears, except in places where the soil is broken, and there it grows in greater or less luxuriance, according to the natural or artificial fertility of the soil.

None of the cereals could exist in this country, if the land were uncultivated. Even the hardiest of them, the bearded small black oat of Scotland (*Avena fatua*), would speedily perish, or be gradually choked by other weeds, unless the soil was in some degree pulverized. It is not now believed that our esculent roots, the Turnip, Parsnep, Carrot, Mangel Wurzel, &c., are really the lineal descendants of *Brassica napus*, *Pastinaca*, *Daucus*, and other wild plants. The more feasible opinion is, that our cultivated plants, like our domestic animals, are real species, if species there be, and not the result of chance, or of fortuitously produced accidental varieties, gradually improved by cultivation. Our Peas, Beans, Tures, and other leguminous vegetables—our Trefoils (except *T. pratense*, *T. repens*, *T. medium*, and a few insignificant because worthless sorts), as well as our cereals, are all introductions. Our Lucerne, Saintfoin, Sea-kale, Cabbages, Greens, Salads, and herbs of various kinds, are worthless in their natural condition, and are only available for human food when cultivated. The land uncultivated would produce food for beasts, but very little suitable for man: he has to reclaim and subdue it, and by incessant toil keep it in subjection.

130. *Number of British Species.*—It has been shown (sect. 129) that there are more distinct plants in the southern than in the northern half of the island; and also that there are rather more species in the eastern counties of England and Scotland than in the western counties, with considerable difference in the species; and also that this difference is owing chiefly to the general tillage of the eastern counties, and to its absence in the west. In most counties,

and probably in several parishes, about one-half of the British plants may be collected. In a circuit of two miles around Hampstead, or on a space of about sixteen square miles, 670 vascular plants and Ferns were collected and catalogued; a portion of Middlesex, comprehending but little variety of soil, consisting chiefly of gravel, plastic clay, and Bagshot sand. In the vicinity of Guildford, Surrey, about 800 plants were collected within a circuit of four miles from the town. A similar circle round Godalming afforded 780. The number of British vascular plants is nearly 1500; but if we reckon the permanent varieties, together with what are by many called excluded, the number will be above 1600.

The number of distinct species of plants in any locality or tract will depend upon the presence of various kinds of soil which cover the surface, on the variety of exposure, on the presence of shade, water, marshy uplands and marshy lowlands, cultivated fields, meadows, &c. Where all these different conditions exist, a large number of species will be found on the space of a few square miles. When the soil and exposure are uniform, the number of species in an equal extent will be fewer than where the soil is of various kinds. Both in the south and north of England large tracts of land are found which bear scarcely any thing but Ling. In places where the soil is more than usually moist, a few *Carices*, *Junci*, and other rushy or sedgy plants, occur; but the *brown Heath* excludes almost every other plant. In the south, *Erica Tetralix*, *E. cinerea*, *Tormentil*, *Agrostis can.*, and *Aira flexuosa*, struggle for a precarious existence. In the northern tracts of heathy ground, both in England and in Scotland, the *Crowberry*, the *Cloudberry*, and sometimes the *Cranberry*, are interspersed among the heath and moss. Where the soil is uniformly *calcareous* or *cretaceous*, either limestone or chalk, the vegetation assumes a totally different aspect. The surface soil is always without stagnant water, and consequently the herbage is grassy. It is, on the other hand, never dry, and the herbage is consequently succulent. The soil is also exceedingly fertile, being the debris of the decomposing limestone or chalk; and it nourishes a multitude of plants which are never seen on the spongy and wet, or dry and gravelly heathy tracts. It is on these wild and totally uncultivated tracts that we may expect to find the descendants and representatives of the original indigenous vegetation of this island. Wherever man has erected a dwelling for himself, and provided shelter for his beasts, there numerous plants spring up, in their aspect and properties very different from the aboriginal species.

The first catalogue of British plants, composed by Wm. How, and published in 1650, above two hundred years ago, contains the names of 1400 plants, with the localities for a few of them. Under this title he comprehends all the cellular or cryptogamous plants then known; viz., *Musci*, *Lichenes*, *Fungi*, and *Fuci* (about fifty in all) together with numerous varieties and most of the commonly-cultivated species of *Wheat*, *Barley*, *Oats*, *Pease*, *Beans*, *garden-vegetables*, &c.; consequently the number in his catalogue should be considerably reduced.

Merret's Pinax, published about six years later, contains but 1280 species, including numerous varieties, counted as species, with above eighty cellulars, and all the cultivated plants of How, with the Potato in addition. He entered double the number of cellular plants found in How, and tripled at least the number of varieties. Consequently he omitted a great number of genuine species found in the former; hence his list is of little use in drawing up a comparison of the numbers of plants noticed at different eras. Ray's Catalogue, published in 1670, is the first list of English plants worthy of confidence, and it is eminently so. He includes all the known cellulars, as his predecessors did; he also admits the varieties or species of *Wheat*, *Barley*, *Oats*, *Rye*, *Pease*, *Beans*, and all sorts of vegetable esculents commonly produced, together with several plants not included by later botanists among English productions; for example, *Hemp*, *Walnut-tree*, &c. The first edition of Ray's *Catalogus Plantarum Angliæ* does not contain quite 1050 species altogether, including the cellulars and cultivated plants above noticed. The second edition, published in 1677, contains nearly 1100, being an increase of forty-six species, viz., of thirty vasculars and sixteen funguses, as additional plants observed by him in the course of seven years. In the last edition of Ray's Synopsis (1696), published in the author's lifetime, 1150 plants are described, including all the cellulars determined by him and the cultivated species as aforesaid. If 100 be deducted for the cellular and cultivated plants therein described or included, the number of such species as are usually included in lists of British plants will be 1050 in 1696, 1000 in 1677, and 950 in 1670. Only the last estimate is rather too low; for Ray informs us that between the appearance of the first edition and the second he had added thirty species of vascular and sixteen of cellular plants. Probably the number of vascular species, comprehended in the first trustworthy catalogue of English plants, was between 950 and 960. In Hudson's first edition of the English Flora (*Flora Anglica*) the number of species is 1153, exclusive of the cellular plants, and this author does not admit the cultivated species. The second edition, published nearly thirty years after the former, includes 1278. Withering's third edition (1796) contains 1350 species; and in the last edition of the London Catalogue, by the Botanical Society, the number of species is upwards of 1460. These numbers, 950 or 960, 1153, 1278, 1350, 1460, beginning with Ray's, as the first authentic list to our own times, indicate the number of vascular plants usually denominated British, exclusive of varieties and cellulars.

131. Two questions naturally suggest themselves on these two mooted points, viz., British species, and varieties. What species are British? and what forms ought to be called species; and what are only mere varieties? No satisfactory answer can be given to either of these questions. A reply to the first is utterly hopeless. No doubt can exist, on the one hand, that some plants growing wild in Britain have existed ever since, or soon after, Britain emerged from chaos or old ocean's bed; nor, on the other, that a large portion of the

plants that have covered, and that are now covering the surface or growing in British soil, have been derived from other quarters—have been introduced either by natural means or by human agency of some sort,—they have been brought hither, either by accident or design. The historian of the British plants has to deal only with facts, not with theories. The facts, or the existence of the plants themselves, are undisputable: the *quo* and *quomodo*, their original *locale*, and mode of introduction, are, in most cases, uncertainties.

A solution of the other question about the limits of species, of the character of varieties, and their essential difference from species? is not a matter of impossibility; yet it is in the highest degree improbable that all men of science will be unanimous on these points. Where the historian is compelled to decide between rival authorities, *via media via tuta* should be his maxim. By this he ought to be influenced in admitting or rejecting dubious, or not generally received species. The historian, whether natural or civil, must derive the great body of his facts from others who have laboured in the same field; and those who have contributed to render his statements comprehensive and trustworthy, deserve his thanks and benevolence. All who, in any way, have aided in the execution of his labour, ought to receive the usual civilities, the *amenities of literature and science*. In works descriptive of the British plants, the species peculiar to Ireland have always formed a portion of the said works. To this there does not seem to be any real objection, and none is offered. There appear to be as valid reasons for entering the few species peculiar to the Channel Islands in a British Flora. It has been asked, with some flippancy, perhaps—"Why not include the plants of Gibraltar, the Ionian Isles, &c., in the Flora of Britain?" It may be replied that the plants of Ireland, Jersey, Guernsey, &c., must either be included among British plants, or form separate Floras. It is surely more convenient for the botanist to have them included in the general Flora of the Kingdom, especially if he visits either of these dependencies with botanical objects. The additional space they require for their names, descriptions, and localities, will not much exceed a hundredth part of the whole space allotted to the names and characteristics of the British plants generally. If the plants of the Channel Islands are to be included in any work not exclusively restricted to themselves, such work must, or ought to be, a general work, either on the British or on the French species. For British botanists, it is surely more desirable to have them in a work descriptive of the former than in one descriptive of the latter.

The Flora of the Channel Islands bears a specific relation to the Flora of Great Britain and Ireland—a relation which does not exist between it and that of any other British dependency, or portion of the British Empire: it is, besides, similar to our own peculiar Flora. Most of the plants of the former are found on this side of the English Channel; and, probably, all of them will ultimately be either found here, or will ultimately find their way to the southern counties of England.

132. *Varieties*.—This term is applied to what may be termed races, as well as to forms aberrant from the common type. The former class (races) of varieties is exemplified by the cultivated cereals—the *Wheat*, the *Barley*, and the *Oats*. There is probably in cultivation more than one species of each of these valuable grain-plants; but the varieties are exceedingly numerous, and they are all more or less permanent; that is, they may be, and are, propagated by sowing *ad infinitum*. They may, and do, degenerate; but the Potato-oat never varies into the early Angus-oat, nor the Common Barley into Chevalier Barley. The varieties of Apples, Strawberries, Roses, and Dahlias, are almost innumerable. The varieties of these first-mentioned plants cannot be preserved by seed, but they are maintained by grafting; and this is generally the case with other fruit-trees and ornamental plants. The countless varieties of culinary *Cruciferae* are all capable of being propagated and increased by seed. They will degenerate and hybridize, but they are permanent. Variable forms, or such as are aberrant from the type, may exhibit minor differences, as in colour and shape of organs, &c.; and these differences are understood to be all reducible to the same original type, when they are connected with it by a series of individuals, so similar as not to be distinguishable from each other. Forms that manifest a tendency to return to the original type, are varieties of this second class (aberrant forms). For example—a pot of seedling Polyanthus will, when in flower, exhibit considerable differences, especially in what is termed the *eye* or central part of the pip (corolla), and in the colour of the edge of the segments. Some will be reddish, and some a deep dark or blackish purple; a very few will have only one or two flowers on the stalk, and in this state approach to the common Primrose; while the greatest part are nearer to the Cowslip or Oxlip in the number of flowers on one stalk. The cause of the latter class of varieties is stated to be owing to soil, exposure, or other causes; and to these other causes, whatever they may be, most varieties must be referred. The numerous varieties of seedlings raised from the seeds collected from a single plant of the Polyanthus variety are all different, and yet they are all raised in the same soil, and with the same exposure. It is still more difficult to account for the permanent varieties or races—such as the *cereals*, the *leguminous*, and *cruciferous esculents*. If *Wheat*, *Rye*, *Barley*, *Oats*, *Rice*, *Maize*, *Millet*, and some other grain-bearing plants, be varieties, the plants from which they are descended appear to have entirely vanished from the vegetable kingdom, and their places are now occupied by the so-called varieties. It is suggested that the hypothesis of their being varieties ought to be considered as quite gratuitous, until the plants are discovered of which they are varieties, whatever these may be. Would it not be as tenable a hypothesis to suppose that they were originally created to be food for man, as that the more common herbage of the field was created for the sustenance of beasts. There appears a somewhat prevalent tendency, among naturalists of the present day, to unite forms that are apparently distinct, because such characters are by these botanists deemed too trivial for the separation

of species. An example of this is afforded by *Anagallis arvensis*, which now includes *A. phænicea* and *A. cærulea*; and they are united because the only or chief distinction between the two is colour. This character, however, slight as it is, has the great merit of permanence. A blue Pimpernel, except on the limestone, oolite, or some modification or other of the calcareous formation, is about as rare as a white crow. Another sort of variety is afforded by the same order, viz., in *Primula vulgaris* or *Primula veris*: the one is said to be a variety of the other, because caulescent forms are found with the stalk of the Cowslip and the blossom of the Primrose. The number of perfect Primroses, and of perfect Cowslips, exceeds the number of caulescent Primroses, or intermediate forms, at least as much as 1,000 exceeds 1.

An obvious mark, however slight, if constant, is sufficient to identify different objects—as the *Anagallis arvensis* var. *phænicea* from var. *cærulea*; and the immense preponderance of numbers, wherein the typical forms of both Primrose and Cowslip are preserved, is amply sufficient to separate the two forms. The term species or variety is immaterial; the only practical question worth solution is—are the marks permanent? for if they be, they will always distinguish the groups of individuals. Whether they should be denominated species or varieties, is another question.

133. *Our Native Plants, Naturalised Plants, Doubtful and Extinct Plants.*—That many of our wild (spontaneous) plants are native or indigenous there is no reason for doubting. Some of the scarcest—the most restricted in horizontal area and in range of elevation—may be as truly native as the most common species, which, as we have seen, possess the widest range. On the other hand, there are certain species widely distributed, and found in numerous localities and copiously in each, which are of exotic origin, having been originally introduced by man, either on purpose or accidentally. But, as we have already shown (sect. 131) that it is impossible to obtain satisfactory evidence of the exotic origin of many species, and because there are divers opinions on this subject, it is judged expedient to drop the term native, and in the present section to consider the British plants under three classes:—1st, Such as are admitted on all hands to be spontaneous, though by many their native origin is denied. 2nd, Those which are spontaneous only on certain conditions other than temperature, &c. 3rd, Extinct plants, or plants only supposed to have been found or seen, other plants being mistaken for them. Such plants as the *Hellebores*, *Soapwort* (*Saponaria officinalis*), several of the *Pink-tribe*, the *Periwinkles*, &c. &c., are undoubtedly well-established plants, and are of spontaneous growth. *Birthwort* (*Aristolochia Clem.*), *Asparagus europæum*, the *Wild Hop*, and several others, are equally well established as the former, though limited in distribution, and in number of individuals. Their indigenous origin is questioned only by some; their spontaneous growth is admitted by all. As the division into native and naturalised plants is impracticable, we unite them under the common character of spontaneity of growth, and consequently admit this large division of so-called naturalized plants,

unchallenged and unquestioned. The only inquiries likely to elicit satisfactory replies and results are such as the following:—Are they well established? What habitats do they affect? How far do they extend? What quantity grow in the separate localities? What is their area, &c.? How long have they been observed to grow there? Do they increase or diminish? It may be observed that, although it be satisfactory to get information of a positive kind, it will not follow that the plant is an interloper or only a casual visitor, though we may be able to learn little or nothing of its antecedents; and although it may be on the decrease, for many or several plants are manifestly in the same situation without the slightest imputation on their characters as genuine natives. It is still less to the purpose to infer that the plant must be of recent origin, because the locality where it was noticed had been repeatedly visited by exploring botanists. The discovery of *Lilium Martagon*, in a copse or shaw at the back of Box Hill, in the early part of the summer of 1840; and that of *Simethis bicolor* in Dorsetshire, about seven years later, are proofs that undetected plants may and do exist in spots repeatedly visited. Copse plants are especially liable to be thus overlooked. *Helleborus viridis* grows abundantly in a copse-wood of a few acres in extent on the southern verge of Ranmer Common, opposite Bury Hill, a field's length or so from the Fox, a rustic, lonely public-house on the ancient pilgrims-path from Winchester to Canterbury, through Alresford, Farnham, Guildford, Dorking, &c. When the coppice wood is six or seven years old there is scarcely a plant of the Hellebore to be observed; but in two or three years after the wood has been cut it grows vigorously, and produces flowers and fruit in abundance, and cannot be overlooked in spring or in early summer. Ranmer Common has been, like Box Hill, frequently visited; but there does not appear to be any record of this plant being ever seen there previously to 1838. Nevertheless the plant is well known by the wood-cutters and cow- or sow-leeches of that neighbourhood. There is another section of these so-called doubtfully British plants, which are very uncertain in the time and place of their growth. The most remarkable of these are the annual or biennial *Mulleins*, *Borage*, *Datura stramon.*, *Veronica Buxbaumii*, *Phalaris canariensis*. But there are some undoubted British species as uncertain in the times of their appearing, *e. g.* *Bupleurum rotundifolium* and *Petroselinum segetum*. Years generally elapse before the re-appearance of these plants in the same fields. The fact of their appearance in places where they are not expected is a proof of their complete naturalisation. The *Borage*, the *Thorn-apples*, &c., are as uncertain on the Continent as they are here, and are found in similar localities, viz., in soil containing an unusually great proportion of nitrate of potash, and this is the character of soil generally in the vicinity of human habitations. A few plants of this section occur so rarely, and at such distances of both time and place, that there are many living botanists who have never seen them growing spontaneously or at all, excepting in collections of plants or in botanical gardens. *Xanthium Str.* and *Amaranthus*

are examples. Nevertheless, as there is good evidence of their having been found, and as they may be again found, it would appear inconsistent to exclude them from any list of British plants. The *Evening Primrose* (*Oenothera biennis*) is a more recent introduction than either of the two above-cited, and it still maintains its ground among our spontaneous plants, and is never omitted in the lists of the plants of its adopted country. The second class, viz., the class composed of such plants as could not vindicate their claims to citizenship but under certain conditions, other than temperature, is a very large section of our wild plants, comprehending all such annuals as are now denominated agrestals or colonials.

The following belong to the 2nd class, and are usually preceded by the mark * (introduced), or † (suspected), viz., Larkspur (*Delph. Con.*) *Pheasant's-eye*, *Papaver Argemone*, and *P. somniferum*, *R. hybrida*, *Camelina sativa*, *Vella annua*, *Isatis tinctoria*, &c. These plants are selected from the total amount of introduced annuals, as having a very limited distribution, and are upon the whole the most suspected of British annual agrestal plants. *Veronica verna*, *V. triphyllus*, and *Chenopodium botryodes*, have as limited areas, and are quite as, scarce plants, as any of the above-mentioned, except *Vella*; and these have never had their origin called in question. *Vella annua* is an agrestal plant, and probably has disappeared in consequence of the discontinuance of cultivation in the locality where it was first noticed, viz., on Salisbury Plain, a very extensive station. It has recently been noticed at Wandsworth, with scores of exotics. The author has since gathered it near Battersea, on mud or soil recently laid on the surface. It had not dissappeared from the Wandsworth Station last September, 1853. All our agrestal annual species, probably a sixth part of the British Flora, would disappear, if the land were allowed to return to its natural condition,—a supposition beyond credibility, but within the bounds of possibility. This proves upon what grounds a sixth part of our Flora depends, viz., artificial conditions. The land in its natural state of meadow pasture, wood, or marsh, could not produce these plants. They could not exist in the ground, if in its natural state, for more than a few years. Other plants would spring up, and choke them, and they would speedily disappear. Several plants besides these are equally maintained by artificial means, such as most of the *Crassulaceæ*, several of the *Caryophyllaceæ*, *Gramineæ*, &c. And if the plants depending solely upon an artificial condition of the soil must be retained, there would be some inconsistency in rejecting *Sedum album*, *S. dasyphyllum*, *S. reflexum*, and even the *House Leek*. These mural (wall) and roof plants would grow on rocks, if there were any rocks in those parts where they find a climate congenial to their healthy existence. They grow in Switzerland on rocks and also on walls, roofs, &c. Here they are restricted to the latter, because the former habitat is not present. Rocks are very rare in the south of England, except on some parts of the coast. There is one wall and roof plant which has never been suspected of being an alien, viz., *Holosteum umbellatum*, a scarce

plant and of very limited range. There is scarcely an argument available against the retention of *Sempervivum tectorum* in a list of British plants, which might not be as reasonably urged against the admissibility of *Holosteum umbel.*, and the former has a favourable characteristic which the latter has not, viz., an extensive range.

The 3rd class comprehends the plants generally supposed to be now extinct in the British Isles, or which were probably never seen growing wild in the stations assigned, and these may be classed in two divisions:—1st, Such as may, without any improbability, have once existed in the places where they are reported to have been seen; and 2nd, such as probably were mistaken for other plants. Among the former may be reckoned, *Ranunculus alpestris* and *R. gramineus*, *Rubus arcticus*, *Potentilla alba*, *Hieracium Auricula*, *Swertia perennis*, *Gentiana acaulis*, *Scilla bifolia*, *Typha minor*, *Echinophora spinosa*, &c. These plants could have been mistaken only by the most careless observers; and the greater part, if not all of them, rest on authority which was unquestioned at the period of their discoveries, and which was besides corroborated by probability. The following, viz., *Buffonia tenuifolia*, *Stipa pennata*, &c., *Cardamine bellidifol.*, *Helianthemum ledifol.*, *Hypericum barbatum*, *Tordylium off.*, *Artemisia cœrulescens*, &c., might have been mistaken, or other plants might have been taken for them. The authority on which they were received is unsupported by probability, for they are entirely confined to the more southern parts of Europe, and some are not very abundant even there. Their centres of distribution are far south of the British Isles, and they are not found in the countries intermediate between the localities where they now exist and this country where they were reported to have been found. There are, however, facts in the distribution of plants now existing in this country which prevent our rejecting even such plants as rest on authority, unsupported by probability *e. g.* *Lilium pyrenaicum*, *Iris tuberosa*, and *Geranium striatum*, occur in the south-west of England, and are not found in any portion of the wide tract that lies between this and the south of Europe. Living authorities justify the admission of these later discoveries among the spontaneous British plants, and consistency opposes the rejection of *Vella annua*, *Stipa pennata*, *Buffonia tenuifolia*, &c. The introduction of *Cardamine bellidifolia* is admitted on all hands to have originated in a mistake; and it is not improbable that the *Hypericum* and *Artemisia* had a similar origin. There is still another argument against expunging these extinct plants from the place which they have so long occupied. There can be no question about such as are universally believed to have been first entered among British species by mistake. If they never were found of spontaneous growth in the places reported, they never should have been recorded, and they may justly be passed over in silence. But such as rest on good authority, whether supported by probability or not, we must not omit, though they have not been collected in late years; and for these reasons:—1st, There are several plants whose origin has never been challenged, that have not for many years been

found in their reported localities. Relhan states (Fl. Can.) that *Senecio paludosus* had not been seen near Streatham Ferry, Cambridgeshire, for years before the publication of his "Flora Cantabrigiensis," which is now a book of above sixty years standing. *Cineraria palustris*, *Sonchus palustris*, and *Elymus geniculatus*, have not, so far as known, been collected within the last twenty years; and the probability is, that these plants are now extinct. No cause is assignable for the gradual decay or disappearance of these species. Their localities are still in the natural state in which they were when these plants were found; they are unaltered either by drainage or cultivation. There are others, viz., *Diotis mar.*, *Chrysocoma Linosyris*, &c., which appear to be gradually dying out, although their habitats remain the same as they were when the plants were more plentiful. 2nd, The progress of agricultural improvements, such as drainage, enclosures, cultivation, the erection of sea walls, &c., has destroyed the habitats, and consequently the plants which formerly grew in them. Whitemoor ponds, near Worplesdon, Surrey, is a recent example of this; and also of the loss of a plant, *Eriophorum gracile*, which grew in this single station. *Gentiana Pneumonanthe* has disappeared from the county of Surrey, where it formerly grew in abundance, and it is not now very common in Sussex, in which latter county it will probably disappear after the lapse of some years. Hence it appears inconsistent to omit such plants as *Buffonia tenuifolia*, *Echinophora spinosa*, *Swertia perennis*, *Gentiana acaulis*, &c. If we reject these, consistency would demand the rejection of *Senecio paludosus*, &c., and probably, in a few years, *Diotis mar.*, &c. In fine, it is considered unadvisable to omit any plant which is now established; that is, can maintain its place among the original or previous occupants of the soil, whatever cause may be assigned for its appearance in or introduction to that locality. Again, consistency requires the retention of the reputed strangers supposed to have been established, but which have, in process of time, disappeared, because certain plants whose native origin is unquestioned, have disappeared, and are gradually disappearing.

It is, however, considered advisable to omit the usual marks indicative of naturalized species; not because there is a doubt of the fact that the species, before the names of which these marks are usually set, were introduced, and have in progress of time been naturalized; but simply because we are unable to assign the various species composing the British Flora to their proper classes of genuine natives, completely naturalized, half-naturalized, stragglers, &c., &c. We think it as impossible to arrange the plants of the British islands under these several classes, as it would be to classify the present inhabitants of Great Britain under the several races or sub-races of Celts, Teutons, Romans, Danes, Saxons,—exclusive of the races formed in more recent times by the intermixture of English, Scottish, Irish, and Welch blood. Plants, not specifically but numerically, are influenced by the intercourse of nations. Some of our plants doubtless had their origin in the remote east, and several have come to our shores from the far west. The north and the south

have each in turn contributed a portion to our floral wealth. No coast blockade, no preventive guard, will ever check the introduction of exotic species. The most determined Conservative, the most decided opponent of novelties, cannot help seeing, at his very feet, objects which were not always seen in this country, several of them ousting the former occupiers, and usurping their place. Our prefixing a star or a dagger, or even refusing to admit them into our botanical books, will not hinder their establishment and increase. Our earlier botanists acted on a different principle. Every plant was a plant to them, "and it was nothing more." To us, their more cautious successors, it is often the cause of much dispute, and sometimes, alas! of ill feeling. The father of English botany—and the illustrious Ray alone is entitled to this honoured appellation—admitted all plants without question. Wheat, Oats, Barley, Beans, Garden and Field Pease, Hemp, Common Chestnut, &c., are found in his Catalogues and in his Synopsis. Hudson marks a few plants as escapes from cultivation—viz., such as he had noticed growing in gardens, probably conceiving, as some moderns do, that every cultivated plant must be an alien, as if the land of England could naturally produce no plant worthy of a place in the garden or field. Hudson's example is not followed by Withering; and though Sir J. E. Smith prefixes the asterisk to a few plants, we cannot say that he was not sufficiently indulgent to the claims of plants only reputed indigenous, and whose title has been often questioned.

Koch, whose works are generally quoted as models worthy of imitation, makes no invidious distinction between the so-called indigenous and introduced plants. Like the famous Ray, who modestly prefixed the obelisk beside the plants which he had not seen, the celebrated German described the plants usually cultivated in Germany; of which, in his Synopsis, there are 7 species of *Wheat*, 4 of *Barley*, 1 of *Rye*, and 3 of *Oats, Hemp, Turnip, Rape, Mustard, Tare, &c.*

If the two classes of plants, the original and the introduced, could be certainly separated and defined, utility or curiosity, or both, might be a reason for adopting and continuing the invidious distinction; but this, we have seen, is impossible. Love of innovation is not the cause of the slight departure from the usage established and sanctioned in these later times. As already stated, it has been found impossible to distinguish between genuine native plants and plants that have been introduced and established during the hundreds or thousands of years that have elapsed since these islands were resorted to by many different tribes of the human race, or since they were separated from the continent. Besides this consideration, there is so little unanimity among botanists on the subject in question, that it is evidently impracticable to adopt any system which would give general satisfaction. One not unreasonably objects to the *Sycamores, Limes*, and *Poplars* being catalogued as indigenous British trees; and asks on what principle the *Laburnum, Chestnut*, and *Larch* are excluded? And again, are half of the reputed British Willows believed by our

best informed botanists to be indigenous? Is it not probable, that if all vegetation in the British isles were to revert to the state in which it certainly existed before man commenced clearing the ancient forests, draining the vales, and cultivating and planting the hills, that our trees, now so numerous, would be reduced to a few species. It may be said that this is a very improbable supposition, but it is only assumed to show that the vegetation of every country, in the occupation of civilised man, must partake, more or less, of an artificial character, which is maintained and increased by human industry, skill, and enterprise.

There is at least a probability that our forest trees are mostly introductions. The Fir, in some parts of Scotland, and the Oak, the Beech, the Hornbeam, and the Birch are probably indigenous in certain parts of England. It is well known that all our plantations are formed of nursery plants; none of them are of spontaneous growth. With the exception of a very few forests in the South of England and in the North of Scotland, where there may still be some timber of natural growth, all our timber and fruit-trees have been raised in nurseries, and subsequently transplanted into their present situations. Some coppice wood, such as Hazel, Ash, and a few Willows, may also be natural; but the timber trees of our woods, hedges, homesteads, parks, meadows, &c., are all artificial. They are indebted to man for their origin, and in the course of time most of them would perish without his care. Trees and shrubs of a hardier character, and better adapted to the climate and situation, would gradually exterminate them, and occupy their place. They exist, and probably are, in some cases, self-propagated on land kept clear; but supposing the whole surface of the ground densely covered with Brambles, Wild Roses, Thorns, &c., the present race of trees might maintain a bare existence; but there would be no room for a spontaneous succession, and in time most of them would perish.

The impracticability of ascertaining the indigenous plants, or, in other terms, of separating the indigenous from the introduced species, has been already stated; and it can be easily shown that such discrimination is useless for any practical purpose.

With due deference to the opinions of other botanists, whose knowledge of plants and their distribution is profound, and to whose writings all students of botany are under heavy obligations, it is here submitted that the only fact worth knowing, respecting the occurrence of any plant in any given or assumed locality, is whether the plant is likely to be permanent in that station, or in its close vicinity. However desirable it may be to know the antecedents of any plant, for which a place is claimed in the Flora of any country or district, it is more important to observe and record the time of its first appearance, its habit, from which its permanence or speedy disappearance may be predicted, the number of individuals, and their increase or decrease since first noticed. Good historical or personal evidence of the introduction of some plants is obtainable; but the historical evidences of the introduction of most economical or or-

namental plants have been for ages irrecoverably lost. Plants, unlike animals, are unable to extend their range to any considerable extent; and every plant, found in a situation which it was not known previously to occupy, must have been conveyed to it either by natural or mechanical agency. Roots, or some portions of roots or seeds, capable of growing, may have been blown thither by the wind, conveyed by currents, floods, &c. or they may, by some means or other, have been accidentally carried thither by animals. But human agency, either wittingly or purposely, is the most common cause of the dispersion of plants. There are certain plants, such as *Common Chickweed*, *Poa annua*, *Shepherd's-purse*, and such like, that accompany the human race in all their wanderings and migrations. The baggage or stuff, which man is under the necessity of conveying with him when migrating to distant parts, can hardly be without some soil or substance containing seeds, or to which seeds may be attached. Seeds, also, are imported in the soil which adheres to the roots of foreign plants, and multitudes of seeds are mixed among corn and agricultural seeds of various kinds, and so imported.

If all the plants originally introduced by human means, either on purpose or by accident, were to be rigidly excluded, our present list of spontaneously growing plants, though not large, would be considerably reduced; and if only such plants ought to be retained, of which the native origin can be satisfactorily proved, our list would be a very meagre one; and if we are to be consistent, the plants, owing their introduction to remote causes, ought to be as rigidly excluded from our so-called indigenous Flora as the stranger of last month or last year. If 1000 years be not sufficient to remove the brand of alienism from a plant, 2000 will be also too short a period for complete naturalisation. It may be admitted that some plants were introduced by the Romans or by the monks, and the first introduction of the latter may be confidently asserted to have taken place at least 1500 years ago. There is scarcely any supposition more credible than this, that the clergy, in these early days, introduced numerous useful and ornamental exotics, both for their own use and delectation, as well as with the view of improving the condition of the rude people amongst whom they had come to sojourn, and whose good will they would naturally employ all legitimate means to conciliate. If we admit this fact, which is grounded both on history and common sense, who can decide the question—viz., how many useful or ornamental trees and plants were natural in this country prior to the arrival of the monks; and how many fruit-trees, culinary vegetables, agricultural seeds, medicinal herbs, garden plants, flowers, &c., were introduced by them? No answer can be given, none ever will be given, because there is no existing evidence on the point. Some would no doubt admit, that all the plants whose area is general—viz., extending from Cornwall to Caithness, and which are also found growing at various elevations above the sea-line up to an altitude of between 2000 and 3000 feet,—

are indigenous. Others would hesitate to admit the claims of cultivated plants, as the Apple-tree (crab), Plum-tree (sloe), and such like; but whether there be unanimity or diversity of opinion on this point, there is no historical or physical evidence, which afford sufficient grounds for any consistent opinion on the subject. There is one well ascertained fact—viz., the gradual amelioration of our climate. A somewhat higher mean annual temperature, and a still more considerable increase in the monthly averages, have taken place in this country, and this change has permitted the gradual extension of the horizontal and altitudinal range of species. But this fact, so far from elucidating the original state of our national Flora, renders the whole subject more complex by introducing another element into the already insoluble problem.

134. The reputed alien British plants, or doubtful or suspected natives, or introduced or naturalised species, may be divided into two classes: 1st, Perennials; 2nd, Annuals. The Perennials may be subdivided into bulbous rooted plants, and into tuberous, or creeping rooted plants. Annuals being propagated by seed rapidly spread wherever they find a soil congenial to their growth; bulbous, tuberous, and creeping rooted plants, either readily spread or maintain their position; bulbs, and tubers, and creeping roots retain their vitality for some considerable time.

The *Snowdrop* is generally described as a reputed alien. In reference to this plant, the question is—whether it be naturalized or not? This is decided in the affirmative by those who have seen it in woods, copses, meadows, &c.; and in the negative by those who have only seen it in gardens. *Fritillaria Meleagris* grows in moist meadows. The latter is reputed indigenous; the former not. But the *Snowdrop* has a more extensive area, and more stations are assigned for its growth than the *Meadow Fritillary* enjoys. On one authority the *Snowdrop* is “an undisputed native;” according to another, it “has been naturalized through the agency of man.” The *Fritillary* is unsuspected. *Ornithogalum umbellatum* is known to occur in thrice as many stations as *O. Pyrenaicum*; but the former is, by universal consent, reckoned among the aliens; and the latter is as constantly called a native, although restricted in latitude and in the number of localities. They are both found in meadows and near hedges. *Scilla autumnalis* is universally admitted to be an undisputed native, though its range be but between 50° and 52°; while *Muscari racemosum* is as universally held to be an alien, though its localities be as numerous as those of the former, and its range equal or greater. This may be sufficient to illustrate what is here contended for, viz., that there is no historical nor other evidence deducible from localities, range, abundance, or any other ascertained fact in the economy of the plants themselves, that authorize authors to decide on the nativity or alienism of any of the above-mentioned species: and twice as many might be brought forward and contrasted. Opinions are, will, and must be different on this subject, according to the facts upon which the opinions of different authors are founded. For the present object, it is sufficient to bring forward

the fact, that authors are not agreed upon what are the circumstances, &c., which entitle a plant to nationality. And it is further maintained that the great majority of such doubtful natives or suspected aliens will ever remain in the same uncertainty as at present. There does not appear, either in the number or in the nature of the localities, anything that authorizes botanists to place *Maianthemum bifolium* in one category (that of alienism), and *Convallaria verticil.* in another. There is nothing in the plants themselves, or in their antecedents and history, which justifies this decision.

Anemone apennina and *A. ranunculoides*, *Helleborus fœtidus*, *Atropa Belladonna*, &c., may be contrasted with *Dentaria bulbifera*, *Isnardia palustris*, *Bupleurum falcatum*, *Lonicera Xylosteum*, and *Pulmonaria officinalis*. The four first-mentioned species, except the last, which is not universally deemed alien, are placed in the category of naturalized or introduced plants; although they have as many trustworthy localities on record as the five last-mentioned. *Asparum europ.* is admitted without question. In this country, *Aristolochia Clem.* is said to be indebted to the Monks for its introduction, and for a place among British plants. In the English Flora, nine stations are assigned to the latter; and rather fewer to the former, with this additional remark, that "it may have been naturalized in some other parts" (than the northern counties) "where," *i. e.* in these other parts, "it occasionally occurs." There is not the slightest intention of denying the fact, viz., that the Monks introduced plants. It is a common practice among all who have any room for amusement or occupation, to plant and sow both for utility and ornament. The object of citing these facts is to show that there is not sufficient ground for deciding whether these species in question are indigenous or naturalized—true natives or introduced foreigners.

These examples are produced, and many others might be adduced, to illustrate and demonstrate the assumption—that it is now utterly impracticable, it may be said impossible, to separate a large proportion, perhaps the largest proportion of our spontaneous plants, from what may be deemed, with absolute certainty, to constitute the original or unquestionably indigenous portion of our Flora.

135. It will be more difficult to decide the question of nationality of species in the second great class, viz., the annuals. On contrasting the reputed natives with the so-called and certainly introduced species of this group, we shall find it impossible to adjudicate on the validity of claims, except in rare cases, where we ground our decision on historical proof. The number of annuals of *quasi* spontaneous growth in this country is, in round numbers, 300—the biennials, which are for convenience joined to this group, are about fifty; they are rather more, but we will assume that both annuals and biennials constitute nearly, perhaps quite, a fourth part of the British plants, assuming the latter at between 1,400 and 1,500. We will further subdivide this large section of our species, both annual and biennial, into two subordinate groups, viz., such as grow in cultivated ground, and such

as grow in places where the surface or turf of the soil is only accidentally or partially broken up. We will confine our observations solely to the former sub-class; *i. e.* such as grow in cultivated places, and which are usually and properly denominated weeds. Agrestal or agricultural weeds only grow in fields among corn or other crops for which the ground is tilled; and the amount of these agrestals or colonists, or field-annual or biennial plants, is, in round numbers, about 210; but in this census several annuals are omitted, because they grow about hedges, on rubbish, and in waste places where the surface is broken, as well as in fields. The *Poppies* are examples of field weeds, being but seldom found elsewhere, also the *Fumarias*, the *Mustard-plants*, the *Pepper-worts* (*Lepidia*), the *Candy-tuft*, *Treacle mustard*, and many other cruciferous plants. The annual *Silenes*, *Chickweeds*, *Spurrey*, and many other plants of this order belong to the same group. Several leguminous and umbelliferous species, with numbers of *Rubiaceæ*, *Compositæ*, *Boraginaceæ*, *Scrophulariaceæ*, *Labiataæ*, *Chenopodiaceæ*, *Polygonaceæ*, and *Euphorbiaceæ* grow in fields, most of them exclusively in cultivated land.

It may be assumed, as an historical fact, that at a very early period there was little or no cultivation in this country. The property of the primitive inhabitants of Britain consisted chiefly of herds of swine, and other domesticated animals, with horses, war-chariots, and weapons offensive and defensive; but the ancient Britons cannot be supposed to have possessed any property in the land, nor to have cultivated it for provision; for this would imply a higher civilization than they had at that time reached. They subsisted, like all other half-savage nations, on the produce of the chase, and on the few animals which they might have reclaimed or subjugated. The swine lived on the produce of the ground, and on the fruit of the trees; and probably their owners were sometimes unable to procure better sustenance. From this historical fact, *viz.*, that the aboriginal inhabitants of Britain did not subsist by tillage, it may legitimately be inferred, that the two hundred agricultural weeds of England could not have existed in the remote times, when Britain submitted to the Roman dominion. The just inference is, that the agrestal weeds were gradually introduced with the cultivation of the soil, and were subsequently increased and extended as more land of different geological formations was brought under tillage; especially when the science of agriculture advanced, and when seeds of various sorts were sown on the reclaimed land. There is still another historical fact bearing on this point, *viz.*, that the annual plants of Britain have increased within the period of botanical research and evidence, and even within the recollection of living Botanists. The following species have been introduced within the last three hundred years, many of them within a much shorter period, *viz.*, *Lolium italicum*, *L. linicolum*, *Setaria glauca*, *Phalaris canariensis*, *Euphorbia coralloides*, *Polygonum dumetorum*, *Veronica Buxbaumii*, *Linaria supina*, *Orobanche amethystea*, *O. arenaria*, and perhaps others of the same genus. *Echinopspermum Lappula*, *Cuscuta epilinum*, *C. Trifolii*, &c.,

Crepis setosa, *Senecio squalidus*, *Erigeron canadensis*, *Valerianella carinata*, *V. eriocarpa*, and *V. auricula*; *Asperula arvensis*, *Galium saccharatum*, *Lotus hispidus*, *Trifolium incarnatum*, *T. stellatum*, *T. Bocconi*, &c. *Medicago denticulata*, *M. minima*, *Althæa hirsuta*, *Lychnis Githago*, *Camelina sativa*, and *C. dentata*, *Alyssum calycinum*, *Vella annua*, *Königa mar.*, *Erysimum orientale*, *Erucastrum incanum*, *Sisymbrium polyceratum*, *Barbarea stricta*, *Fumaria parviflora*, *F. micrantha*, and *F. Vaillantii*. About fifty annual or biennial plants have been introduced, and the majority of them well established in the space of fifty or at most one hundred years. But if we double the time, or even triple it, there would, at the same rate of increase, still be ample space for the introduction and naturalization of all our agrestal plants, viz., from the remote period when the inhabitants of the British Islands first began agricultural operations. It may be objected, that some of these more recently described species were included under other kindred species; and also that some of them were overlooked, and several have ceased to exist. Admitting the validity of this objection, and setting off a reasonable proportion of the new-comers to meet it, there is still a sufficient number remaining to prove our assumption, viz., that there has been an increase of the British agrestal plants since the period of historico-botanical testimony, which does not reach back much above 200 years. And the legitimate deduction is exactly that which in the first place was assumed, viz., that our spontaneous-growing species have increased, and that this increase commenced at a very remote period—long before historic times; and, finally, that it is now utterly impossible to distinguish the aboriginal from the adventitious plants. But in proving our assertion we are not restricted to annual and biennial agrestal plants—there are several other sorts which materially strengthen our position, viz., *Lepidium Draba*, *Reseda fruticulosa*, *Silene italica*, *Malva verticillata*, *Hypericum calycinum*, *H. linariifolium*, *Acer Pseudo-platanus*, *Geranium phæum*, *G. nodosum*, *Impatiens fulva*, *Oxalis corniculata*, *Medicago sativa*, *Spiræa salicifolia*, *Fragaria elatior*, *Rosa rubella*, *R. cinnamomea*, *R. Dicksoni*, *Pyrus domestica* (our Flora once possessed this tree—a single one, it is true—but who can say that there is not another specimen in the British Isles?), *Oenothera biennis*, *Sedum album*, *S. dasyphyllum*, *Sempervivum tectorum*, *Ribes Grossularia*, *Saxifraga Geum*, *Astrantia major*, *Petroselinum sativum*, *Bupleurum aristatum*, *B. falcatum*, *Anthriscus Cerefolium*, *Lonicera Caprifol.*, *Asperula taurina*, *Valeriana pyrenaica*, *Centranthus ruber*, *Nardosmia fragrans*, *Antennaria margarit.*, *Campanula persicifolia*, *C. Rapunculus*, *Orobanche Hederae*, &c.; *Linaria purpurea*, *Mimulus luteus*, *Calamintha sylv.*, *Stachys germanica*, *Teucrium Botrys*, *Statice rariflora*, &c.; *Spiranthes cer.*, *S. æstivalis*, *Sisyrinchium anceps*, *Iris tuberosa*, *Maianthemum bifol.*, *Simethis bicolor*.

As regards the native origin of most of these species there exists no difference of opinion among the botanists of the present day. The majority of them are probably of only recent introduction. At all

events, some of them were not known, except as cultivated plants, fifty years ago; and several of these very recently-noticed species of spontaneous growth are now so firmly established that all attempts to preserve the immaculacy of the Flora by the eradication of the intruders, or by obstinately refusing to admit their claims to a place among the other spontaneous productions of the British soil, would be equally futile. It is not maintained that they are all equally well established; it is only asserted that in places all or most of them are as firmly stationed as many of our undisputed natives. In progress of time, several of them will undoubtedly obtain a wider range, and a larger number of localities, and more individual plants will grow in each station. With such facts as these occurring before our eyes, can there be any doubt about the possibility of separating the genuine undoubted natives, as they are called, from the justly-suspected aliens? A native or truly indigenous plant ought to have existed, in or near its present localities, ever since the land of this country was sufficiently elevated above water to admit of its growth. Every plant that migrated posterior to this geological period, from whatever quarter it came, ought to be looked upon with as much suspicion as the introductions of the last few years.

136. It is probable that many, if not most, of our agrestal annual weeds have been introduced by some means or other. Corn cockle (*Lychnis Githago*) found its way among seed wheat imported from the south into the Garioch district of Aberdeenshire, above forty years ago. The plant was not previously observed in that neighbourhood. Certain annuals appear among Flax, as the *Camelinas*; some usually among Wheat, as the *Bupleurum rotundifolium*. This latter plant and *Petroselinum segetum* usually appear at intervals of several years, from four to seven, and are not observable in the intermediate seasons. These and many others may be accidental human introductions. But is a plant less entitled to a place in an enumeration of British plants, on the assumption that the introduction was intentional? Who can tell how many of our forest trees are indebted to human agency for their present localities? How many hedge-row trees, lawn and grove trees, farm-yard trees, &c., have been planted on purpose? How many Willows and Poplars are indigenous? No satisfactory reply can be given to all or any of these queries. The answer, besides, is immaterial. The only queries to which precise replies are really material are such as these. What are the qualities of the tree or shrub? What are its accidents, *i. e.* its habitat, range, elevation, power of reproducing itself in its present or in similar localities without any farther aid from man? If under existing circumstances a plant does maintain its ground, or has the power of self-reproduction, it matters little how it was conveyed into its present locality, whether accidentally or designedly. The fact worth knowing, and it is knowable by observation and experience, is the permanency of the given plant. That any scientific botanist would distribute plants and seeds merely for the sake of mystifying and misleading his brethren is utterly incredible. The object is an unworthy

one. Few others have the means or the desire either to gratify or to disappoint the eager searcher after botanical rarities.

137. It is gratifying to be able to trace the migration of a plant, or to discover its origin; but how rarely can this be satisfactorily accomplished. *Mimulus luteus* is a rare exception; and as its distribution, which is very considerable, has occurred before our eyes, we can easily account for it. *Impatiens fulva* is another example which may have occurred, and probably did so, nearly two hundred years before the *Mimulus* was seen or even heard of in this country. *Impatiens fulva*, now growing so plentifully about the Sittingbourne and the Wey, in Surrey, and extending several miles down the Thames, though rather sparingly in the latter river, doubtless originated in the gardens of Albury. There is not a single specimen at Shere, though not more than a stone's throw above the gardens of Albury Park; nor on the Wey above its confluence with the Sittingbourne; but in and below Albury Park, along the course of the rivulet, and the Wey below Shalford, and in the Thames below its junction with the Wey, the plant abounds in places, and has probably extended fifty miles from the place of its origin. We cannot thus explain the existence of *Lilium Martagon*, near Mickleham, Surrey, nor that of *L. pyrenaicum*, in Devon, nor of *Simethis bicolor*, in Dorsetshire, nor of *Anacharis canadensis*, in many counties of the kingdom. The latter plant was unknown here only ten years ago. In the latter case we have *viva voce* testimony, that in some localities, where it was introduced by human agency, it has increased prodigiously; so that, in fact, it is likely to become a troublesome weed, so completely filling up the dykes (water channels) as to render them unserviceable both for drainage and navigation. This is a case in point; can we refuse this plant a place in our lists of the British species, because in certain situations we have testimony of its introduction by parties who placed it there, and in other situations it has been accidentally introduced? All the particulars respecting it, saving the immaterial one, 'How came it here?' can be answered satisfactorily. For example, it can be affirmed with certainty that a little bit of the stem thrown into still water will fill a ditch in a few months. Also that, unless it be speedily rooted out, it will exclude everything else, and eventually quite fill up the ditch.

138. The rejection of undoubtedly spontaneous plants is a detriment to science, and is not compensated by any corresponding advantage. Some botanists are deterred from recording their discoveries, choosing to let their knowledge pass into oblivion, or die with themselves, rather than hazard the contradictions and controversy which so often arise when any discovery is announced. Such an announcement is too often met with purely gratuitous assertions, such as the following:—"An escape from cultivation," "an outcast from gardens," "the produce of rubbish heaps," &c. Escapes and outcasts can only be garden and cultivated plants. Ballast heaps are localities (habitats) for a few plants of very uncertain occurrence; and such heaps are not found everywhere, either by the sea-shore, or

even on the banks of tidal rivers. It is very probable that some discoverers of rare or foreign plants have misapplied the term indigenous, employing it instead of spontaneous. The fathers of British botany did not hamper themselves with this term indigenous; and foreign botanists content themselves with spontaneous and subspontaneous as sufficiently descriptive. To decide satisfactorily whether certain plants be indigenous or not indigenous would imply an amount of knowledge rarely possessed by those who are the most energetic and successful investigators of local botany. But none are incompetent to decide if a plant be spontaneous or not. In most doubtful cases, some information can generally be gleaned from resident botanists, gardeners, herbalists, or others, by which the discoverer may satisfy himself that such a species is not a mere *parvenu* or a wayfaring straggler of but ephemeral appearance. Those who are the most successful of collecting botanists may be the least qualified judges of the spontaneity of species; and those who are qualified to give a correct judgment do not always enjoy the mental energy or physical strength to qualify them for discoverers. To the labours of their young and more active *collaborateurs* in the fields of science they must be indebted for many facts. With little trouble, evidence may be obtained which would satisfy any one that the plant in question is of spontaneous growth; but what proof can be given that the plant is indigenous? There are several plants of very uncertain appearance, both as it respects time and place. But this uncertainty does not militate against the spontaneity of their growth. But this part of the subject has already been noticed.

TECHNICALITIES.

ON THE GRAND DIVISIONS, GROUPS, CLASSES, ORDERS, GENERA, AND SPECIES OF PLANTS.

139. BEFORE defining the terms, whereby these are represented, it will be necessary to state the principles or characters on which the divisions are founded, by which they are limited, and on which their application for any practical purpose depends. These characters are derived from the three systems of organs present in all the higher orders,—viz., the *Elementary*, the *Vegetative* or *Nutritive*, and the *Reproductive*.

ELEMENTARY ORGANS.

Cellular Tissue.

Vascular Tissue.

a. Spiral vessels.

b. Ducts.

Stomata.

VEGETATIVE ORGANS.

Embryo or Spore.

a. Cotyledon.

b. Radicle.

c. Plumule.

Root, Stem, Leaf,

Frond, Thallus.

REPRODUCTIVE ORGANS.

Stamens and Pistil.

Fruit.

Pericarp.

Theca.

Perianth.

a. Corolla.

b. Calyx.

Inflorescence,

Torus, Nectary,

Bract, Involucre.

140. The tissues, the spirals, and ducts (laticiferous vessels), with the stomata, are of primary importance in the economy of plants; all, or some of them, being present in every plant. On these organs, therefore, the primary or grand divisions of plants are founded. *Cellular tissue* constitutes the principal part of most plants, when in a growing state. The cells appear to be the most active vital organs in all stages of the life of the plant, and cellular tissue constitutes the whole substance of a considerable portion of the lower orders of plants. It also forms the chief part of the other orders comprehended in this grand division; hence termed *Plantæ cellulares*, or *Cellulars*. In the higher orders of cellular plants there is a higher or more complete organization; and hence they form a connecting link between cellular and vascular plants.

141. The vascular tissues characterise the next primary or grand division—viz., *Plantæ vasculares*, or *Vasculars*, which are distinguished by having vascular tissue, spiral vessels, ducts, and stomata, in addition to the cellular tissue common to them and to all plants. It should be remarked, that although these simple and internal organs are of the utmost importance in the economy of vegetation (for without them no plant could exist), they are of no very high practical value in the separation or limitation of grand divisions, groups, or orders. They distinguish the three lower orders of *Algae*, *Fungi*, and *Lichenes*, from the other cryptogamous orders—viz., *Hepaticæ*, *Musci*, *Filices*, &c., which are possessed of other simple organs, and have a more complicated external organization. It is evident that a character pervading all orders cannot be applied as a diagnostic mark of any one of them; and the presence of cellular tissue in *Algae*, *Fungi*, and *Lichenes*, is not properly the diagnosis of these three orders; they are distinguished rather by the absence of vessels and stomata, and their character is negative, not positive. The second series of organs is the vegetative, of a lower value in the economy of the plant, but more important, as distinctive characteristics of groups and classes. These organs are of higher importance than the next series in the economy of the plant, but not so available for furnishing characteristic marks of groups, classes, and orders, as the third series—viz., the organs of reproduction. The *embryo* or *spore* is the primary vegetative organ,—the future plant in a rudimentary state. The essential difference between these two bodies (for embryo and spore are not equivalent or synonymous terms) is, that the embryo is a more complex organ than the spore, and is contained in what is called seed. In the spore any portion of its tissue is capable of germination; in the seed only the embryo germinates; and this germinating portion of the seed is hence called the *germen* or *embryo*; these two terms are equivalent. By the presence or absence of the embryo all plants are divided into *embryonate* and *exembryonate*. The former term is equivalent to vasculars, and the latter to cellulars, thus:—

Cellulars, without spirals, ducts, and stomata (usually); or
Exembryonate, without an embryo.

Vasculars, without vascular tissue, ducts, and stomata; or
Embryonate, with an embryo.

The character of exembryonate plants is negative, just as the character of cellulars is. The character of embryonate plants is positive, just as the character of vasculars is.

The presence of only one or of two or more cotyledons in the embryo affords the means of subdividing the vascular plants into two groups, viz. :—

Monocotyledons, having their embryo with only one cotyledon.

Dicotyledons, having their embryo with two or more cotyledons.

The character of the first group is negative (without two cotyledons), that of the second is positive.

By the manner in which the stem is developed, all plants are divisible into classes. Thus, in the orders *Algæ*, *Fungi*, *Lichenes*, and *Hepaticæ* in part, the development of the stem is in all directions from a centre or axis of vegetation.

Hence the first class, *Amphigens*, is founded on this central mode of development.

Second class, *Acrogens*, stem increasing at the apex.

Third class, *Endogens*, stem increasing internally.

Fourth class, *Exogens*, stem increasing externally.

The leaves, as have been shown (sect. 22), afford important, constant, and obvious marks for classification.

By the third series, the reproductive organs, viz., the flower, fruit, and seeds, all the orders, the genera, and sometimes the species, are distinguished.

142. The apparently popular division of all plants into *flowerless* and *flowering* plants, or into cryptogamous and phanerogamous (phænogamous) plants, is of no real practical value. Those who have the slightest knowledge of botany do not require it, and those who have no knowledge of the science are puzzled to apprehend its correct application. The objection to the terms, *flowering* and *flowerless* plants, is very obvious. The popular mind cannot conceive that a flower exists, unless there be present the floral verticils, or whorls, or envelopes, which are termed petals, or a corolla; consequently people in general class *Grasses*, *Sedges*, *Rushes*, *most trees*; all the species in the orders, *Urticaceæ*, *Euphorbiaceæ*, *Polygonaceæ*, *Chenopodiaceæ*; and many of those in the orders, *Illecebraceæ*, *Caryophyllaceæ*, &c., among the flowerless plants. Also one of the Ferns is popularly called the *Flowering Fern*; and *Polypodium vulgare* is popularly said to bear flowers on the back of its leaves; and indeed its fructification is quite as conspicuous as the flowers of hundreds of the so-called flowering plants are. *Staminiferous*, *pistilliferous*, or *seminiferous* plants, would convey a distinct definite idea, which the term *flowering plants* does not. As the terms are unnecessary, they may be omitted. To which of these grand divisions, viz., flowerless or flowering plants, do the *Rhizanth*s belong?

As these three systems of organs are of certain definite importance in the economy of vegetation, they are arranged in conformity

with this principle. The tissue occupies the first rank, and all the forms of vascular tissue are set subordinately to the cellular, which is the most important of all the tissues, and also of all the organs. The embryo stands at the head of the second rank, being subordinate to the tissues; but it is the most important of the nutritive organs: as no plant of the grand division which produces seeds can be without an embryo; but several have no real stems; many have no real leaves, and some exist without roots. The stamens are deemed the most important organs of the third series; and they, consequently, occupy the first rank in the third place. Every organ, except the cell, which is the only universal organ of plants, is placed in subordination to some other organ, which is considered of higher value than the one immediately below it.

Hence it appears desirable, that in the application of characters derived from organisation, or in the description of grand divisions, groups, classes, orders, genera, and species, the characters derived from the various organs should be arranged in conformity with their subordinate values. For classes, and still less important groups, it is evident that it is impracticable to draw up diagnostic characters from the first series of organs, for this reason, that characters or marks common to all classes and orders cannot serve as distinctive characters of any of them. The first class, *Amphigens*, alone is distinguished by the absence of the more complex tissues, which are all more or less present in the other classes. When the second system of organs affords distinguishing marks, and are employed to aid in the investigation of classes, orders, &c., the most important organ will occupy the first place in such description; and the subordinate organs will be arranged on the same systematic principle of subordination which is prevalent in the general economy of the vegetable kingdom. In the application of the marks derived from the third series of organs the same principle will be maintained as far as practicable. This procedure will both preserve a uniformity in the descriptions (an important object in all scientific investigations), and greatly facilitate the identifying of orders, genera, and species; for analogous characters will always thus occupy the same position.

143. *On the Identification or Determination of Groups, Classes, Orders, Genera, and Species.*—The most certain and most scientific way of identifying any plant unknown to the investigator (that is, of ascertaining its exact place in a systematic arrangement, or, in other words, the easiest and shortest way of discovering the name of the group, class, order, genus, or species to which a given plant belongs), is to proceed analytically, from the most general and comprehensive term vegetable or plant, to the less general and more restricted terms group, class, order, &c. As an object the plant has an organisation in common with animals, from which it is always to be distinguished by negative characters, viz., the want of volition and sensation. Plants have not the power of choosing and rejecting; nor have they sensation. The non-existence of both of these distinctive characters, it is granted, are rather the results of inferences than deductions from known facts.

A plant is without the loco-motive power of animals; hence we infer that such faculty is not necessary to its well-being. It is without the power of self-defence; hence it is inferred, that it is not subject to painful sensation. From these two inferences the third is inferred, viz., that in the economy of the creation plants are involuntary agents. Natural objects are incapable of rigid definition; they cannot be described in so precise terms as the truths of mathematical science. It is known that many animals of the lower grades are incapable of motion, and consequently manifest volition only in a very slight degree. It is also generally admitted that the susceptibility of pain is always in proportion to the complexity or delicacy of the animal structure or organisation. Hence some animals are scarcely distinguishable from plants. But generally there are no practical difficulties in assigning to their proper kingdoms the various individuals belonging to each. For example—the *Slug* and *Mushroom* are very simple in their organisation; but they are never confounded. The stag has more properties common to the slug, one of the simplest of the voluntary beings, than to the oak, one of the most complex of the organised involuntary objects. The latter is immeasurably distant from the short-lived minute Fungus: but it possesses more characters common to the lowest grade of plants, than to any subject of the animal kingdom whatever.

144. The grand principle of classification is the possession of common characters in the objects classified; while separation, division, subdivision, &c., is founded on the absence of certain characters. Plants are usually defined as beings without sensation, volition, and locomotion,—all negative characters, and more or less distinctive, but in practice quite useless, as we have seen; for in all common or prominent objects belonging to either kingdom, no person is at a loss in distinguishing the one from the other; and in the obscure and minute species of both kingdoms, the greatest naturalists and philosophers are often unable exactly and satisfactorily to define the extreme limits of the vegetable and animal kingdoms, or to state where the one ends and the other begins. The vegetable kingdom can be divided or subdivided into grand divisions, groups, &c., by the presence or absence of external organs. The elementary organs, the embryo, and spore are all obscure objects, and can only be observed by the aid of powerful magnifiers; and such nice manipulation is required, in the useful employment of these instruments, that this department alone—that of observing and recording the appearances of minute objects, is now considered a distinct science (Histiology). For our purpose the knowledge of external organisation will be amply sufficient.

145. The absence of stem, leaves, flowers, and seeds generally distinguishes the first grand division of plants (Cryptogams). The first class, *Amphigens*, has no proper root nor stem, nor leafy organs, nor flowers nor seeds. This class is connected with the next, *Acrogens*, by an intermediate order (*Hepaticæ*, Fig. 103), which has no stem, leafy organ, nor flower; but is an expansion more or less extensive, with organs of fructification, somewhat elevated on slender stalks, differing

in shape from the rest of the plant. *Acrogens* has a rudimentary stem, which, in most of the Ferns, is more like a leaf-stalk than a stem.

In the Mosses and Lycopods (Fig. 104-105) the stem is developed like a thread, more or less slender, surrounded on all sides by rudimentary leaves (scales), and with terminal fructification. The *Equiseta* (Horsetails, Fig. 106) have true stems, either simple or branched, without leaves, and with terminal fructification. All other plants have real roots, stems, and leaves; or, if either of the two last-named organs be wanting, there are other organs present which certainly identify the plant. Most of these plants have conspicuous flowers; or if they have not, the place of flowers is supplied with what have been called the essential parts, viz., stamens and pistils, either both sorts of organs in juxtaposition, or in a state of separation; if separate, either on the same plant, though on different parts of it, or on distinct plants. By keeping in mind these prominent characteristics any plant may be readily assigned, either to the cryptogamous or to the phænogamous grand divisions of plants. And as each of these grand divisions is subdivided into two groups, the next thing to be determined is, to which of these groups or classes does the assumed plant belong? The first group, or class of cryptogams, viz. *Amphigens*, comprehends the three orders of plants, which are specially characterised by the homogeneousness of their internal structure, and the simplicity of their external form. In both internal structure and external form this class is analogous to inorganised objects, any portion of any plant being similar to any other portion of the same plant. The obvious negative character, viz., the absence of stems and leafy organs, will be sufficient to determine the class to which any plant of these three orders belongs. The higher orders of Cryptogams are distinguished by their rudimentary stems and scale-like leaves. None of these, with the exception of the *Equiseta* (Horse-tails), have a real stem. In *Mosses* and *Lycopods* the stem is a slender thread-like process, and in *Ferns* the whole plant is rather a leaf (frond), than a stem and leaves. A very slight inspection of the cuts illustrating these orders will convey a very clear idea of these plants. (See Figs. 101, 102, 103, &c.) The second grand division of plants, viz., the phanerogamous or phænogamous species, is also subdivided into two groups or classes, viz., *Endogens* and *Exogens*. The plants in the former are marked generally by a greater simplicity, both of internal structure (see Sects. 12 and 22), and also of external organisation, than the plants of the latter.

In the class *Endogens* the stem and leaves are usually simple; that is, the former is generally without branches, and the latter are not divided—mostly quite entire. These two classes are also characterised by differently organised stems (see Sect. 12), by remarkable differences in the nervation of the leaves, and by the normal number of floral organs, seed, &c.

146. The sub-class, or group of orders, the genus, and species, are to be determined by carrying on the analytic process, as above. An example of a common plant, traced by its characteristics from the

primary and most general idea—vegetable through its class, order, genus, and species—will make the matter plain. Let the assumed plant be *Ranunculus bulbosus* (Bulbous Crowfoot). First, it has a real stem, leaves, and flowers; therefore it is a plant of the second grand division. Second, it has a branching (not simple) stem, and compound incised (cut) leaves, with branched nerves (not simple and entire with unbranched nerves, as in *Monocotyledons*), and five sepals and five petals. Hence it is to be referred to the dicotyledonous plants, the second class of phanerogamous species. The first class or subdivision of *phanerogamous* plants (*Monocotyledons*) has simple stems, with simple and entire leaves, and the normal number of floral verticils is *three*. Third, the perianth is double—*i. e.* calyx and corolla are both present, and the petals are distinct (polypetalous); therefore it is a plant of the third division of dicotyledonous species. Fourth, the petals and stamens are inserted on the receptacle or *torus* (see Sect. 28 and Index); therefore it belongs to the second subdivision of the third division. Fifth, the placentation is axile, arranged round a prolongation of the peduncle or torus, or receptacle, which is the common character of the second section of the second subdivision of the third division of dicotyledonous plants. Sixth, the stamens are free and indefinite, the carpels are numerous, and the calyx is deciduous. These are characters of the order *Ranunculaceæ* to which the plant assumed belongs. Seventh, the carpels are one-seeded, and without an appendage (tail); therefore it belongs to the sub-order *Ranunculeæ*. Eighth, the claws of the petals are furnished with a minute pore, which is either covered by a scale, or it is naked, and the carpels form a roundish head; therefore it belongs to the genus *Ranunculus*. Ninth, the stem terminates in a bulbous base, the peduncles are furrowed, and the calyx is reflexed; Therefore it is *R. bulbosus*.

147. *On Nomenclature, or the names of Species, Genera, Orders, and Classes.*—The specific name of a plant is not the name of an individual; but the name of a larger or smaller group of individuals. A specimen of *Ranunculus bulbosus* is a single plant of a group of plants, all of them agreeing in certain marks, as bulbous root, branched, hairy stem, leaves sheathing at the base, peduncles furrowed, calyx reflexed, &c. Every individual has a certain idiosyncrasy or peculiarity, whereby it may be distinguished from every other individual of the same species, as the group of individuals is called. Each plant, however, will differ from every other plant. The size or shape of the bulb, the length, thickness, or hairiness of the stem, the number, the divisions, and shape of the leaves, will all differ sufficiently to enable any one to distinguish one individual from another. There is a variety in the magnitude, shape, and colour of all natural things, and that variety exists not merely in the contour and size of the entire individual; but it is to be detected in every single organ composing the individual. All individuals agreeing in what are called specific characters, as above stated, form what is called a species; and the character must be so constructed as to comprehend every individual

—not an individual portrait, or description, but the description of a species or indefinite number of individuals; all individually different, but all agreeing with each other better than they agree with any other individual which belongs to what is termed a different species. For example, every single plant of *R. bulbosus* will agree better even with the most diverse forms of its species than it will with any forms of *R. acris* or *R. repens*. This is the sense in which the term species is generally understood, viz., a collection of individuals which have more characters common to each other than they have to anything else. Species is a collective or abstract term, an appellative common to an indefinite number of objects. The term genus, *Ranunculus*, e. g., is a still more general term than species. It comprehends a group of species, as species comprehends a group of individuals; it is, consequently, a more abstract and more comprehensive term than that of species; or the word or term *Ranunculus* embraces many more individual plants than the term *R. bulbosus*. The order embraces a still greater number of objects combining and including genera, as genera contain species. Plant or vegetable is the most abstract or general term, comprehending, of course, all divisions, classes, orders, genera, species, and individuals. The words by which these groups, classes, &c., are known, are mere conventional terms employed to assist the mind in the comprehension and expression of general truths, and to combine larger or smaller assemblages of individuals. The last-mentioned only are realities, and these have no names. Few individual natural objects, except the names of countries, tracts, mountains, hills, rivers, seas, &c., have proper names. All the names of plants are names of groups, not of individuals. These groups are not real things, any more than the names by which they are represented are individual or proper names. They are conventional and artificial combinations of natural things, but not therefore natural. Political and other combinations of people are artificial, not natural. Individuals are so; but classes, orders, genera, and species of plants are no more natural than empires, &c. These terms, which are current in every natural science, should and must be correctly apprehended, before the student can make any satisfactory progress in the knowledge of the objects presented to his notice or observation in that branch which is the object of his research. The single individual, or the many individuals, the one or the several alone, are real. The groups called species, genera, &c., are abstractions, and the terms which represent these abstract ideas are either adjectives or abstract nouns. For example, *bulbosus* is an adjective, and qualifies, in the oft-quoted example, *Ranunculus*. The latter is an abstract noun, neither the name of any individual nor even species. It is the common name applied to every plant which possesses the characters limiting that genus; i. e. having petals with small pores at their base, and bearing one-seeded carpels without tails. The term *Ranunculeæ* comprehends a sub-order or group of genera, having aggregate carpels, &c. *Ranunculaceæ* is a term including a still larger group of individuals. Both of these two

latter terms are adjectives; the first, *Ranunculeæ*, signifies that the plants so defined or restricted have more characters similar to *Ranunculus*, and other genera forming the sub-order *Ranunculeæ*, than to any other sub-order; the latter, *Ranunculaceæ*, implies that the plants have fewer characters in common, and, consequently, a remoter similarity to *Ranunculus*, which is supposed to be the type or representative of the whole order. The term *Rose* is generic, or general, including as it does the Dog Rose, one species or group of *Roses*; also the *Sweetbriar Rose*, the *Scotch* or *Ayrshire Rose*, and many more groups or series of *Roses*. The *Strawberry*, the *Cinquefoil*, the *Bramble*, and many other genera combined, form, with the *Rose*, the sub-order *Roseæ*, i. e. *Rose-like plants*; and this sub-order, or tribe, united with other sub-orders, composes the order *Rosaceæ*, or *Rosaceous plants*. The *Rose* and the *Ranunculus* are usually termed the types of the orders *Rosaceæ* and *Ranunculaceæ*; though in strict logical precision every individual plant of the two orders should be a representative of one or other of them respectively; for every individual of an order or genus must possess all the characters of that genus or order; otherwise it does not belong to it, and ought to be placed in some other genus or order with which it does agree. But the *Rose* and the *Ranunculus* are called typical of their respective orders, not because they display the ordinal character better than the other genera composing these orders, but rather because they are popular, showy, highly-developed plants.

148. In botany, every species is recognised by two names or words; the first is the name of the genus, an abstract term; the second, the qualifying adjective, as *Ranunculus bulbosus*; both together designate the species. The Genus is known by one term, viz. *Ranunculus* or *Crowfoot*, *Rosa* or *Rose*. When the order is subdivided into sub-orders, or tribes, the termination of the sub-order is not the same as that of the order. There is a uniformity in the terms indicating the order; most of the ordinal terms end in *aceæ*, a few in *feræ* (from *fero*, I bear), and a very few in *tæ*, as *Labiataæ* and *Compositæ*.

The names of classes, or sub-classes, and those of other higher and more comprehensive groups, are adjectives; the word *plantæ* (plants) being understood as implied in all the terms expressive of orders and other more comprehensive groups of plants.

149. As one of the objections urged against science in general is the nomenclature employed in speaking or in writing about scientific objects, it is worth while to show the real state of the case, and to prove the absolute necessity, as well as the convenience, of using terms and phrases which are neither employed in the language of common life nor of literature.

It is an obvious truth that new or previously unknown objects must be represented in language by new terms, or by a modification or alteration of terms previously existing. Either new words must be invented or coined, or the signification of old words enlarged, or several terms must be employed for the designation of one object.

It is sometimes asked why the common objects, the productions of

our native country, are not expressed by terms contained in our native language? and, again, is our language deficient in copiousness, flexibility, polish, &c.? or why we are compelled to have recourse to what are properly termed the classical languages of antiquity, in order to find terms for the expression of common things? In justification of the common practice, it may be said, Were our language as copious, systematic, flexible and precise as the Greek, or as regular, clear, and concise as the French, we should still be under the necessity of deriving, from some source or other, terms and phrases for the expression of new objects, and for the explanations of new combinations! It is true that the objects and their organisations are not absolutely new, but they are relatively new. They are practically new to those who never saw or understood them before. This is really the case in reference to two-thirds, or probably three-fourths, of the British plants, and to at least nine-tenths of the plants known at the present day. In the infancy of natural science (and all natural sciences were in their infancy about three hundred years ago), the general names, *Grass*, *Bramble*, *Willow*, and any other similar words, included a great many objects supposed to be identical, or as far as species can be identical, which subsequent experience and more accurate observation have proved to be distinct. For these newly distinguished objects new names were necessary, and these new names had to be derived either from our own or from some other language.

150. The only common (*i. e.* not classical or learned) languages from which such new terms can or could be procured, are the ancient British or Anglo-Saxon languages; but our remote ancestors, who spoke these languages, did not know more plants than our forefathers did, who lived when natural science, and especially botany, began to attract a more than usual share of attention. The Greek and Latin were almost the only languages known by the fathers of Natural History; at all events, they were the only languages understood generally by the learned throughout the world; and to these languages the first writers on Botany necessarily had recourse. Besides this, the primitive fathers of European Botany, viz., Aristotle, Theophrastus, Dioscorides, Varro, and Pliny, in their own works, of course, used their native languages—Greek and Latin; and the moderns adopted their nomenclature. Caraway (*carwas*), Daffodyl, Fennel (*fenigyl*), Glas (*glaswort*), Gladwyn (*Iris*), Dwale, Wort, Cress, Thorn, Root, Mint, Weed, Dock, Wood, Grass, and several other terms, used either simply or in composition, are ancient British and Anglo-Saxon words. These and a few other native verbal roots, used either as simple or as compound terms, are only sufficient to give names to about one-seventh of the plants now recognised as British. For the other six-sevenths, authors have borrowed terms from Latin, French, or Greek. A large proportion of what are generally considered common English names are only apparently so: they are Latin or Greek, either with or without an English termination; for example, the following are all naturalised words, with only a slight change of

ending, viz., *Aconite*, *Anemone*, *Betony*, *Borage*, *Briony*, *Centaury*, *Chamomile*, *Cherry*, *Dandelion*, *Fritillary*, *Fumitory*, *Hellebore*, *Agrimony*, *Mallow*, *Juniper*, *Lettuce*, *Medick*, *Mercury*, *Pasque-flower*, *Pellitory*, *Periwinkle*, *Polypody*, *Poplar*, *Rose*, *Saintfoin*, *Scabious*, *Succory*, *Chicory*, *Sycamore*, *Thyme*, *Vetch*, *Vervain*, *Violet*, and several others. *Orchis*, *Alsarabacca*, *Veronica*, *Verbena*, and *Bugloss*, retain their original terminations, and have become naturalised and privileged terms in our language, as several of the plants have in our soil. Another point bearing on this subject is this. It is a fact that the words of Latin and Greek origin have displaced a great many of the original Anglo-Saxon words; and the few names following will show that the native names of several plants have been supplanted by names of foreign origin, viz., *Anemone*, *Dandelion*, *Columbine*, *Fritillary*, *Veronica*, *Tussilago*, &c., which are more popular and better known names than *Wind-flower*, — a *bed*,* *Cock's-foot*, *Guinea-hen-flower*, *Speedwell*, *Colt's-foot*, &c. The former are the scientific; the latter are what were the popular or common names; but the scientific are better known than the common terms. It is also a fact, that there are not now found growing wild, in the British isles, many more than two hundred plants or trees of all kinds which ever had genuine, well-known, or popular English names. The rest of the plants were utterly unknown, or unregarded, or undistinguished, or confounded. There was a time, not very remote, when, under the terms *Dog-rose*, *Bramble*, and *Grass*, all the wild *Roses*, amounting to twenty—all the *Brambles*, some say above forty—and most of the *Grasses*, above 130, were all included under these three terms.

With the *Grasses* were united the *Sedges*, *Cyperaceæ*, about ninety species. Whence could terms, for these gradually distinguished or discovered plants, have been obtained? Not from the common language, in which they did not exist; for the people only know and understand terms applied to things with which they are familiar; and these differences in plants were and are now unnoticed by them. The common agricultural populace know the difference between wild and cultivated *Grasses*—they know the difference between the several sorts of cultivated *Grasses*, whether they be cereal, or fodder, or pasture plants: but they do not understand the differences between wild *Grasses*. Everything growing spontaneously in a cultivated field is a weed, and to be eradicated as soon as possible; and every plant growing in meadows and pastures, and which prevents better fodder and grazing plants from growing there, is also, in their vocabulary, a weed. Names had to be taken from some source or other; and Greek, Latin, French, and even English compound words would have been all alike intelligible to the learned, and unintelligible to the unlearned. And these terms never could have become popular, because they were the representatives of objects unknown to the people—things in which they had no interest.

It has been already stated that the collective, or generic, or ordinal terms were borrowed from the Latin and Greek authors, and retained

* *Pisse en lit*—Monk's head, or Priest's crown.

in all descriptive Botanical works, and that it was necessary to employ a specifying word or phrase taken from the same language. For example—the expression *Ranunculus bulbosus* is more euphonious, as well as more grammatical, than *R. bulbous*. Bulbous Crowfoot is proper, but not *Ran. bulbous*. It may be said that one series of names would be sufficient; and if so, why encumber the nomenclature with a pair of terms? It is doubtless convenient that names should be applied to objects, or groups of objects, intelligible to the greatest number interested in the study of such objects. English names would, in the case of many plants, be unintelligible to many English botanists, because these names vary in different provinces, and even in different counties of the same country. The Latin or scientific names are universally recognised, not by English or European botanists only, but by botanists all over the world. It is desirable to have the most generally applied English name attached to the scientific name, and this is invariably done in this work, except in a few instances, where no popular name has as yet been given by a previous authority. The necessity of inventing or borrowing new terms, in order to represent new objects or groups of objects, like species has been shown; and the same necessity is involved in the case of new genera. It is convenient to split a genus whenever the group of species which it comprehends is very large, or when the species differ very much from each other, *e. g.*—the genus *Gramen* has not only been split or subdivided into hundreds of genera, but it has formed materials for two orders, *viz.*, *Gramineæ* and *Cyperaceæ*. This involved the necessity of adopting and constructing new names. The names of what was anciently deemed species, were applied to genera; and in these two cases the generic names became ordinal names. The names of orders or sub-orders, classes and sub-classes, all originated in the same necessity, *viz.*, that of some term or terms expressive of these new combinations, which were demanded by the progress of science. Nothing could have been gained by adopting periphrastic definitions, instead of abstract individual terms, when genera, orders, and classes were to be the subject of writing or discourse; and much would have been lost in brevity, precision, and, above all, in facility of reference and of intercommunication.

151. *Of the Signification of the Names of Species, Genera, and Higher Groups.*—The specific names of plants are mostly adjectives; and the largest part of them expresses some characteristic of some one or other of the various organs. *Repens* means creeping, either the root or the stem having this property. They often express shape, colour, number, &c., as *rotundifolium* (round-leaved), *purpureum* (purple), *foliosus* (leafy), &c.; they express habit, as *humifusum* (prostrate), *scandens* (climbing), *vulubilis* (twining), &c.; also locality, as *sylvatica* (in the woods), *rupestris* (on rocks), *palustre* (in marshes), *maritima* (by the sea-shore), &c. They sometimes express likeness to other plants, as *nymphæoides* (like the *Nymphæa*); sometimes they express economical uses, as *sativa* (edible), *officinalis* (medicinal),

Tinctorum and *Fullonum* (used by dyers and cloth-dressers). They sometimes express duration, as *annuus* (annual), *biennis* (biennial), *perennis* (perennial). They are sometimes commemorative, as *Salteri*, *Borreri*, *Sprengelii*, *Balfourianus*, &c., in honour of Mr. Borrer, Herr Sprengel, Drs. Salter and Balfour.

Generic names, as before-stated, are abstract substantives; and the specific name agrees with them in gender, number, and case, except in a few commemorative names of species which are in the genitive, as *Borreri*, &c. The names of genera are frequently significant, as *Campanula* (a little bell), *Rhamnus* (ῥαμνος), or *ramus* (a branch). They often indicate a fancied resemblance to something else, as *Lycopsis* (like a wolf's head). They are very often poetic, as *Iris*, *Amaryllis*, *Hesperis*, &c. Very often commemorative, as *Hutchinsia*, *Hottonia*, &c. The names of sub-orders, orders, classes, and grand divisions, are all significant, as *Chenopodeæ* (like the *Chenopods*), *Chenopodiaceæ* (like the *Chenopods*, but with a remoter resemblance), *Monochlamydeæ* (plants which have a single floral envelope), *Endogenes*, or *Endogens* (plants whose stems increase interiorly), *Vasculares*, or *Vasculars* (plants having both cellular and vascular tissue).

Technicalities of Botany, verbal and phraseological.—One of the popular objections to science in general, and to Botany in particular, has been already stated and answered, viz., its so-called un-English barbarous terminology. It has been shown that objects totally unknown to people in general, both to the unlearned and the learned, could not have received names in current use, for none such existed; and that it was more beneficial to science in general that terms should be borrowed or derived from a language common to the learned and scientific men of Europe, rather than from that of any individual nation. It may be conceded to the objectors, that the nomenclature is not in every instance so expressive, nor so euphonious as it might be rendered. But the inconveniences necessarily resulting from a change in names which have been in use for longer or shorter periods would be very great, and the advantages attending such an alteration would be very trivial and uncertain. The objection to technicalities in description must be dealt with in the same way. Nothing but either necessity or convenience can justify the introduction of words and phrases which the objectors affirm barbarize our language, mar its beauties, &c. Some of these novelties, no doubt, are uncouth—some of them may be pedantic; but science can easily vindicate its claim to a language in some degree peculiar to itself—a claim which is advanced by Theology, Poetry, Business, Trade, Sociality, &c., and cheerfully conceded to each and all who write or speak on such pursuits, employments, and conditions of humanity. Our religious writers, and our vernacular poets abound in phraseology, which would be offensive, or at least out of place in politics, and in the affairs of common life. We appreciate the propriety of scriptural phrases when the pulpit orator employs them. Why should we expect the occupant of the platform, or the scientific writer, to describe the objects of nature in language

adapted to the nursery or the shop? On all hands it will be admitted that necessity, and even expediency, are valid reasons for introducing new words, new combinations of words, or new phrases, &c., which are not denied to be linguistic novelties. Necessity is not controllable by any law; and the laws of human language are no exception. Nothing is more mutable than language. Custom, the sovereign arbiter of speech, sanctions, and has sanctioned from time immemorial, the use of lingual peculiarities in all industrial occupations, in social and domestic intercourse, in theology, poetry, philosophy; in all compositions intended either to instruct, recreate, entertain, or amuse mankind. This concession is begrudged to the professors of the natural sciences alone. They only made their appearance at a late period in the history of man, and sometime after most languages were completely established. There was a period, not a very remote one, when our most ordinary fireside culinary and domestic utensils were unknown, undescribed, and consequently unnamed. And even in the present day the furniture and decorations of our apartments, the garniture and harness of our beasts of draught and burden; the implements of husbandry, of artizans, artists, and professionals of all kinds; the various productions of architectural and manufactorial industry, are known and described by terms and descriptions which are far from being generally current in our language. There is no art, no employment, no trade nor handicraft, however limited, which has not some terms peculiar to itself, and which are generally unknown beyond its own narrow circle. This is justified by necessity. New products, whether of the hand or of the head, must have new names to distinguish them from the old; and new uses, new modes of production necessitate new wants; and one of these is a change in language generally effected by the introduction of new words and new phrases. In the earlier botanical descriptive works, before the invention or introduction of the present specific names—when an author had occasion to quote or to refer to the name of any plant, he was under the necessity of referring to it by quoting its characteristics; for example—*Ophrys apifera* (Bee Orchis) is referred to by Ray in his Synopsis, thus:—“*Orchis fuciflora galea et alis purpurascentibus.*” In Bauhin’s Pinax, this plant is named *Ophrys fucum referens major, foliis superioribus candidis et purpurascentibus*. This clumsy method of description and reference was the only one known before the substitution of trivial or specific names, for which science is indebted to Linnæus. In the language of literature and common life, we find it convenient to substitute a pronoun for a noun, when the repetition of the name would be inconvenient. It is equally allowable and convenient to substitute the name of a thing instead of its description. This justifies the use of the technical words—*calyx, corolla, stamens, pistils, ovary, style, stigma, capsule, ovule, foramen, mycropyle, &c.* The same principle—expediency—may be a valid plea for radical or root-leaves, stem-leaves, floral whorls or verticils, calyx-teeth, &c.

Terms descriptive of both organs and functions are in existence;

and their judicious application is conducive to clearness, to conciseness, and even to elegance of description. Without these terms, viz. technicalities and scientific phrases, the description of natural objects would necessarily be tedious, clumsy, vague, diffuse, and indefinite. The external organs are susceptible of numerous modifications: the root, for example, of above twelve; the stem has many more; the different forms and positions of the leaves, the floral organs, &c., are still more variable. How are all these to be expressed in an intelligible way without having recourse to conventional terms—such as are used in the description of organs and functional operations. Suppose, for example, there were no such terms as root, stem or stalk, leaf or flower, indicative of the various organs of herbs, trees, or blossoms, would not science be an impracticability; and the description of such objects quite impossible?

These remarks are not made with the view of defending scientific pedantry, or for justifying pedantry of any sort. The necessary, convenient, and judicious use of terms appropriate to scientific description is only pleaded for. Scientific writers claim merely what is by common consent conceded to all public instructors, whether they employ the pulpit, the press, the platform, or the rostrum for that end,—a right which every one takes and gives in all the concerns of life. A sparing use of technology, a concession to the scruples of the lingual purist, and a tenderness towards the uninitiated, or it may be the indolent, are the most practicable and effectual means of hushing the silly clamours against natural science, of eradicating the prevalent misconception that science is only a system of crack-jaw outlandish words, devised to puzzle the inquirer, and to conceal the hollow pretensions of the sciolist. There may be both dullards and pedants in the ranks of science, as there are in all other ranks of life. It may be that science is sometimes shrouded, veiled, or mystified under a mass of scientific or learned phraseology; but it is not true that the objects of scientific research and investigation can be adequately represented by the language common on the exchange, in the workshop, or at the fireside.

There is another prejudice, not perhaps strictly confined to Botany, but directed against it, and especially in reference to the system according to which it is now generally communicated and acquired.

It is probable that the Linnæan system, as it is called, took deeper root, and was more extensively cultivated in England than in any other country in Europe. This was no doubt owing to several causes, but chiefly to the establishment of the Linnæan Society, and the munificence of its early patron, Sir Joseph Banks. In some measure also our possession of the Linnæan Herbarium, and the eminent attainments of Dr. Withering and Sir J. E. Smith in botanical science, and the excellence of their works contributed to the popularity of the Linnæan system, in accordance with which their works were constructed. No real friends to science can wish to disparage a system founded by so eminent a naturalist as Linnæus undoubtedly was,—a

system patronised and adopted by all European naturalists, and to which we are mainly indebted for the great accumulation of facts in natural science, for which the present age is so remarkably distinguished. It is urged, in favour of the Linnæan method, that it is easy to refer any plant to its true place in this system, and against the other or natural system, as it is called, that it is often very difficult to determine the order to which certain plants belong. There is an apparent truth in both of these assertions. It is very easy to determine if a plant has three, five, or ten stamens; and it is difficult to determine the natural order of such plants, as *Glauz* or *Samolus*. But where the stamens are minute, or not constant or variously united, or on different parts of the same plant, or on different plants, or contiguous to the pistils, and on the same or on different plants, the process is not so easy as in certain plants where the stamens are large and easily determined. The uninitiated cannot, without special instruction, ascertain the classes to which *Fumaria*, *Polygala*, *Trifolium*, *Taxus*, *Atriplex*, and many other plants belong: while the orders, *Gramineæ*, *Cyperaceæ*, *Compositæ*, *Cruciferae*, *Labiatae*, *Dipsacæ*, *Rubiaceæ*, &c., can be certainly determined by the slightest inspection. During the prevalence of the Linnæan system, botanists had scarcely any object beyond that of determining the names of plants, and assigning them their place in the system. The analogies, affinities, and relationships of plants were not primary objects with scientific men, as they are in the present day. The number of plants then known was barely one-tenth of the number now known. About 10,000 distinct plants were known by Linnæus and his contemporaries. The number known at the present day is probably above 100,000. Eight years ago the estimated number was 93,000. While the number of plants was only a tenth part of those now known, and while botanists were satisfied with such a slight acquaintance with their organization as might suffice for the identification of species, and for ascertaining their generic coincidences, the Linnæan system was amply sufficient, and provided for all the requirements of that period. With the accumulation of multitudes of new facts, new methods of scientific description, and of more systematic arrangement, began to be entertained. Preciser and more comprehensive classification was desirable. A single organ, as the stamen, was considered too limited and arbitrary for the foundation of a system; and the elementary tissues and the external organs were employed successfully by botanists, both in France and England, as fundamental principles of classification. It is perhaps to be regretted that almost every systematic botanist adopts his own views on this subject. The systems of Jussieu, Brown, Decandolle, Endlicher, and Lindley, have not been able to secure anything like that universal adoption which the system of Linnæus obtained. But about the limits of the natural orders themselves most botanists are agreed, and the arrangement of the orders themselves is a matter of minor importance. Dr. Lindley's *Vegetable Kingdom* is probably the most comprehensive and practical work on the subject of the natural orders of plants, as

it is certainly the most intelligible to British botanists in general. On these accounts it has been, in the present work, principally followed, both in the description of the orders as well as in their arrangement. The popular objection to the system now generally adopted is, that it is more difficult in its application than the now nearly obsolete system of Linnæus. Even were the validity of this objection conceded, it does not follow, as a thing of course, that the latter method is preferable to the former. It is true that the Linnæan class and order can in many plants be determined with tolerable certainty; but the genera of the Linnæan orders not being connected by any common characters, their determination is a work of difficulty.

Even for the very superficial objects of naming and classifying plants, the natural system presents the student with facilities and advantages unattainable by the other. The name may be as readily learned, and the organisation, affinities, properties, &c., may also be simultaneously acquired.

The natural orders of the British plants are about a hundred, and one-fourth of these orders contains nearly three-fourths of our spontaneously growing plants. Most of these large orders are easily determined; for example, *Cyperaceæ* and *Gramineæ*. Above one-seventh of all our plants are certainly determined by the stem, *Orchidaceæ* by the flowers; *Compositæ*, about one-tenth of the British plants, by their compound flowers; *Umbelliferæ*, by their inflorescence; *Labiata* by the stem and leaves; *Rubiaceæ* by the leaves; *Boraginaceæ* by their gyrate inflorescence; *Ranunculaceæ*, *Leguminiferæ*, and *Cruciferæ*, by their fruit. In the Linnæan arrangement the Grasses and Sedges constitute part of three classes, and as many orders. The *Labiata* plants are found in two classes and two orders. The *Plantaginaceæ* constitute a portion of two classes, though the British species are only six. *Gentianaceæ* are in two classes, and in several orders, though having only a small number of British species. It is not now a matter of opinion that the natural system is destined to supplant the previous one; it is a matter of fact. The latter is supplanted by the former. It is nearly as useless to exalt the one as it is ungenerous to decry the other; *de mortuis nil nisi bonum*. The Linnæan system is virtually dead, and will in the next generation be utterly forgotten. Miss Wakefield's "Introduction to," and Pinnoek's "Catechism of Botany," will by that time have passed into oblivion; and Sir J. E. Smith's English Flora will be consulted only for the excellence of its specific descriptions. The system on which these once valued works were composed is in this country certainly defunct, and will never be resuscitated. Every recent botanical work, whether introductory to the science, or systematic or descriptive, is based on some one or other of the natural systems on which every work must be founded which professes to present a consecutive and comprehensive statement of facts relative to the common as well as to the individual organization, characters, and properties of plants. The duration or ascendancy of any one of these so-called natural systems cannot be

predicted. It is sufficient for us to know that any of them amply provides for the exigencies of science, and is, besides, in accordance with the advancement of knowledge, and with the progressive spirit of the age.

TAXONOMY:

OR THE ARRANGMENT OF PLANTS INTO SPECIES, GENERA, ORDERS, CLASSES, AND DIVISIONS.

All created beings are divisible into material or immaterial, corporeal or spiritual; they are either external and sensible (objects of sense), or internal and intellectual (objects of the understanding). All material things are in like manner susceptible of a binary classification. They are either inorganised or organised. Again, inorganised objects are either ponderable or imponderable. In like manner, organised objects are either endowed with volition and sensation with the capability of locomotion, or they are involuntary insensible objects without the capability of locomotion.

Animals.—Voluntary agents with power of choosing or rejecting, possessed of sensibility, and endowed with locomotive faculties.

Vegetables.—Involuntary agents, without the power of choosing or rejecting, not possessed of sensibility, nor endowed with the power of locomotion.

Vegetables are divided into two grand divisions, viz.:

Acotyledonous Plants, or *Acotyledons*.—Seeds not cotyledonary (without cotyledons, radicle, and plumule).

Cotyledonous Plants, or *Cotyledons*.—Seeds cotyledonary (with cotyledons, &c.) These two grand divisions are equivalent to the *Exembryonate* and *Embryonate* plants of Richard, and to the *cellular* and *vascular plants* of Decandolle. They are also identical with the *Cryptogams* and *Phanerogams*, or *Phænogams* of earlier and later authors. These two grand divisions are each divisible into two groups or classes.

I. *Amphigens* entirely cellular, or of homogenous structure, without a distinct axis of growth.

II. *Acrogens*, partly vascular, with a distinct axis of growth. The order, or sub-class, *Hepaticæ* (Liverworts), connects these two classes or subdivisions.

The second grand division, viz., *Cotyledons*, is also subdivided into two subdivisions or classes, viz.:

III. *Endogens*, or *Monocotyledons*.—Stem increasing by internal growth; nervation of leaves simple; seed with one cotyledon.

IV. *Exogens*, or *Dicotyledons*.—Stem increasing externally; nervation of leaves not simple (branched); seed with two cotyledons.

The sub-class *Dictyogens*, or the orders *Tamaceæ* and *Trilliaceæ*, connect these two classes. The order *Coniferæ* is polycotyledonous

(bears seeds with several cotyledons). The third class *Endogens* is divided into two divisions, viz. :

1st Division.—Perianth scarious, rudimentary, or herbaceous.

2nd Division.—Perianth all-coloured, or only partly herbaceous. The first group of the first division bears albuminous seeds; the second group ex-albuminous seeds. These two groups form each two minor groups, which are characterised by the ovary being free, or being attached, thus:

† Ovary free.

†† Ovary attached.

The presence or absence of floral envelopes, and the freedom or attachment of the ovary, are available for the subdivisions of the dicotyledonous orders.

SYNOPSIS OF THE NATURAL ORDERS OF BRITISH PLANTS.

ACOTYLEDONS, or Cryptogamous plants. Vegetative system consisting of cellular tissue alone, or with some vascular tissue, without flowers and seeds; reproduced by spores (homogeneous embryos).

1st Class, AMPHIGENS. (See index.) Vegetative system entirely composed of cellular tissue without a distinct axis of growth, increasing all round the circumference. Orders, 1. *Algæ*; sub-order, *Characeæ*; 2. *Fungi*; 3. *Lichenes*.

1st Order, *Algæ*. Aquatic plants usually of the very simplest structure and form. *Characeæ* has a distinct cellular stem and whorled branches, with axillary or terminal fructification.

2nd Order, *Fungi*. Terrestrial plants, generally succulent; reproductive matter more or less diffused in their substance.

3rd Order, *Lichenes*. Terrestrial, coriaceous, crustaceous, or pulverulent plants, with their reproductive matter only in certain parts.

2nd Class, ACROGENS. (See index.) Vegetative system composed of both cellular and vascular tissue, rarely without a distinct axis of growth, and with a more or less complex form, increasing by their extremities. Orders, 4. *Hepaticæ*; 5. *Musci*; 6. *Lycopodiaceæ*; 7. *Isoetæ*; 8. *Marsilleaceæ*; 9. *Equisetaceæ*; 10. *Filices*.

Note.—The genera and species of the orders preceding *Lycopodiaceæ*, with the exception of *Chara* and *Nitella*, with their species, are not described in the present work.

4th Order, *Hepaticæ*. The Liverwort Family.—The lowest form of plants with an axial development, connected in organisation and form with *Lichenes* on the one hand, and with *Musci* on the other.

5th Order, *Musci*. The Moss Family.—Small, often minute plants, with root, stem, and leaves; reproductive matter in closed spore-cases (theceæ).

6th Order, *Lycopodiaceæ*. The Club-moss Family.—Plants, with creeping, prostrate, or upright stems, more or less branched. Leaves imbricated in rows, minute, resembling moss-leaves. Fructification axillary, either in spikes or scattered. Genus *Lycopodium*.

7th Order, *Isoetæ*. The Quillwort Family.—Aquatic leafy plants, with radical fructification. Genus *Isoetes*.

8th Order, *Marsilleaceæ*. The Pillwort Family.—Aquatic, extensively creeping plants, with tufts of leaves and radical fructification. Genus *Pillularia*.

9th Order, *Equisetaceæ*. The Horsetail Family.—Stems hollow, jointed, mostly erect, with whorled branches and terminal fructification. Genus *Equisetum*.

10th Order, *Filices*. The Fern Family.—Usually stemless; leaves (fronds) coiled in prefoliation; fructification on the under surface of the leaf, or in clusters at the summit.

Tribe 1, *Polypodiææ*.—Fructification dorsal (on the back of the frond), without or with a cover (indusium), usually pedicelled, enclosed in an elastic, incomplete ring. Gen. *Allosorus*, *Gymnogramma*, *Polypodium*, *Woodsia*, *Pteris*, *Adiantum*, *Blechnum*, *Scelopendrium*, *Ceterach*, *Asplenium*, *Cystopteris*, *Athyrium*, *Pseudathyrium*, *Polystichum*, *Nephrodium*.

Tribe 2, *Hymenophylleæ*.—Fructification on the margin, not pedicelled, but sessile on the nerve, with a complete ring. Gen. *Trichomanes*, *Hymenophyllum*.

Tribe 3, *Osmundææ*.—Fructification pedicelled, with an incomplete or no ring on the upper part of the frond, which is usually contracted and deformed. Gen. *Osmunda*.

Tribe 4, *Ophioglosseæ*.—Frond not coiled in prefoliation; fructification sessile in a spike or panicle. Gen. *Botrychium*, *Ophioglossum*.

MONOCOTYLEDONS. (See p. 131, and § 12).—Stems usually herbaceous; pith, wood, and bark undistinguishable; leaves generally entire, with parallel, unbranching nerves; floral envelopes and organs in threes, or multiples of three; seed germinating, with one cotyledon.

3rd Class, ENDOGENS. (See § 12).

1st Division.—Perianth scarious or herbaceous, sometimes consisting of bracts (scales), or of hairs.

† Ovary free.

1st Subdivision.—Terrestrial or aquatic plants, with albuminous seeds. Orders, *Gramineæ*, *Cyperaceæ*, *Juncaceæ*, *Eriocaulaceæ*, *Typhaceæ*, *Araceæ*.

11th Order, *Gramineæ*. The Grass Family.—Stems hollow, with swollen, solid joints (knots, nodes); leaves with split sheaths, and a scarious extension above the sheath called a ligule; flowers either solitary or placed alternately on a common axis, with scarious bracts at the base. Anthers attached by their centre, notched; albumen copious, farinaceous.

Tribe 1, *Paniceæ*.—Spikelets in a spicate panicle, digitate or branching; sometimes in spike-like clusters, compressed at the back (dorsally); all the florets perfect, or some perfect and some imperfect; styles long; stigmas projecting beyond the glume (scale or pale of some authors). Gen. *Digitaria*, *Panicum*, *Setaria*.

Tribe 2, *Phalarideæ*.—Spikelets peduncled or almost sessile, arranged in a more or less compact spicate panicle, rarely in a digitate

or branched panicle, sometimes in a filiform or cylindrical spike; spikelet laterally compressed, single flowered, all the florets perfect; styles long; stigmas rarely projecting beyond the glumes. Gen. *Phalaris*, *Anthoxanthum*, *Alopecurus*, *Phleum*, *Cynodon*.

Tribe 3, *Agrostideæ*.—Spikelets arranged in a branching panicle, rarely in a clustered or spicate panicle, more or less laterally compressed, rarely dorsally compressed or cylindrical; florets all perfect; stigmas sessile, or on very short styles not projecting beyond the glumes. Gen. *Agrostis*, *Calamagrostis*, *Ammophila*, *Arrhenatherum*, *Holcus*, *Melica*, *Stipa*, *Milium*, *Leersia*?

Tribe 4, *Aveneæ*.—Spikelets peduncled, very seldom nearly sessile, arranged in a branching panicle, rarely in a spicate panicle, or in a spike; florets several in the same spikelet, the upper one often abortive; glumes very large enveloping the spikelet; stigmas sessile, rarely reaching to the summit of the glume. Gen. *Sessleria*, *Koeleria* (*Aira*), *Danthonia* (*Poa*), *Corynephorus* (*Aira*), *Avena*, *Aira*, *Airopsis* (*Knappia*).

Tribe 5, *Festuceæ*.—Spikelets peduncled, rarely almost sessile, arranged in a branching panicle containing several florets; glumes (exterior) shorter than the spikelet, rarely projecting beyond the lower floret; stigmas sessile, or on very short styles, rarely approaching the summit of the glumes. Gen. *Phragmites*, *Eragrostis*, *Poa*, *Catabrosa*, *Glyceria*, *Molinia* (*Melica*), *Briza*, *Cynosurus*, *Dactylis*, *Festuca*, *Bromus*.

Tribe 6, *Triticeæ*.—Spikelets sessile, in a simple spike corresponding to depressions of the axis (rach), one or many-flowered; stigmas sessile, or on very short styles. Gen. *Lolium*, *Triticum*, *Secale*, *Hordeum*, *Nardus*.

12th Order, *Cyperaceæ*. The Sedge Family.—Stems not hollow, often angular and without prominent joints; leaf-sheaths not slitted; flowers subtended by a single bract (scale); anthers inserted on the filament by their base, not notched.

Tribe 1, *Cariceæ*.—Flowers unisexual, rarely dioecious, in scaly imbricate spikes; fruit without capillary hairs at the base, in an envelope open at the apex for the protrusion of the stigmas. Gen. *Carex*, *Kobresia*.

Tribe 2, *Scirpeæ*.—Flowers perfect in scaly imbricated spikes, the lower scales often abortive; fruit with or without capillary hairs at the base. Gen. *Rhynchospora*, *Heleocharis*, *Scirpus*, *Cladium*, *Eriophorum*, *Blysmus*?

Tribe 3, *Cypereæ*.—Flowers perfect in compressed spikelets in two rows; fruit with rudimentary hairs at the base, or none. Gen. *Cyperus*, *Schœnus*.

13th Order, *Juncaceæ*. The Rush Family.—Stems usually round and tapering, either solid or filled with pith; leaves sheathing, hollow, or flat, often reduced to a scaly sheath; perianth six-parted, scarious; fruit capsular, three-celled, three-valved, many-seeded. Gen. *Juncus*, *Luzula*.

14th Order *Eriocaulaceæ*. The Pipe-wort Family.—Stem with

six-eight angles; leaves sheathing; flowers in heads; perianth of fertile flower four-parted. Gen. *Eriocaulon*.

15th Order, *Typhaceæ*. The Bull-rush Family.—Stems solid, firm, without prominent joints; leaves flat or keeled; male and female flowers distinct, on a cylindrical spike or round head; male flowers naked; female flowers either with three scales or surrounded by hairs. Gen. *Typha*, *Sparganium*.

16th Order, *Araceæ*. The Arum Family.—No stem; leaves stalked, broad; flowers quite naked, on a fleshy coloured axis, surrounded by an involute, leafy spathe. Gen. *Arum*.

2nd Subdivision.—Seeds without albumen; aquatic plants.

17th Order, *Lemnaceæ*. The Duck-weed Family.—The vegetative system of these plants is extremely simple, consisting of minute leaf-like expansions, connected with each other, and producing flowers and seeds on the margin. The male flowers have one stamen and the female a single, several-seeded ovary, both inclosed in a membranous cellular sheath (spathe). Gen. *Lemna*.

18th Order, *Zosteraceæ*. The Grass-wrack Family.—Leaves long, linear, blunt, quite entire, sheathing; flowers unilateral, imperfect in a sheath; anthers one-celled, on a very short filament; ovary one, with a subulate style and two stigmas; fruit membranous, one-seeded. Gen. *Zostera*, *Najas*.

19th Order, *Potamaceæ*. The Pond-weed Family.—Stems branching; leaves mostly submerged, upper leaves floating; perianth in four divisions, or absent; ovary of four distinct carpels; fruit one-seeded, not opening (indehiscent). Gen. *Potamogeton*, *Ruppia*, *Zannichellia*.

20th Order, *Juncaginaceæ*. The Arrow-grass Family.—Stems solid? with linear or sword-shaped leaves; flowers in spikes or clusters; perianth herbaceous in six divisions; fruit consisting of three-six, one or two-seeded carpels. Gen. *Triglochin*, *Scheuchzeria*.

2nd Division.—Perianth either all coloured or partly herbaceous; aquatics.

† Ovary free.

1st Subdivision.—Outer portions of the perianth herbaceous or slightly coloured; inner parts coloured. Orders *Alismaceæ*, *Butomaceæ*.

21st Order, *Alismaceæ*. The Water Plantain Family.—Herbage quite smooth; leaves with a broad flat limb on leaf-stalks; three outer pieces of the perianth herbaceous; three inner pieces coloured; fruit an usually indefinite number of distinct one-seeded carpels, rarely two-seeded. Gen. *Alisma*, *Actinocarpus*, *Sagittaria*.

22nd Order, *Butomaceæ*. The flowering Rush Family.—Stems erect; leaves linear, cellular; flowers in umbels; perianth herbaceous, or slightly coloured in six divisions; fruit six-nine many seeded carpels, either free or united by the sutures. Gen. *Butomus*.

2nd Subdivision.—Perianth coloured, rarely herbaceous; terrestrial plants. Orders *Colchicaceæ*, *Liliaceæ*, *Asparagaceæ*, *Trilliaceæ*.

23rd Order, *Colchicaceæ*. The Colchicum Family.—Roots fibrous

or fleshy; stems erect or absent; leaves sheathing; flowers in spikes or clusters; fruit capsular, of three carpels united by the ventral suture; seeds many. Gen. *Colchicum*, *Tofieldia*.

24th Order, *Liliaceæ*. The Lily Family.—Roots fibrous or creeping, with solid and coated or scale-like clustered bulbs; stems various perianth coloured in six divisions; fruit capsular, three-celled, many seeded; seeds attached to the inner angle.

Tribe 1, *Tulipeæ*.—Bulbous plants, pieces of the perianth almost distinct; coat of the seed soft, pale white. Gen. *Tulipa*, *Fritillaria*, *Lloydia*, *Lilium*.

Tribe 2, *Scilleæ*.—Bulbous plants; flowers smaller than in the above tribe; seed-coat brittle, black. Gen. *Scilla*, *Agraphis*, *Muscari*, *Ornithogalum*, *Gagea*, *Allium*.

Tribe 3, *Anthericeæ*.—Roots fibrous; stem, if present, upright. Gen. *Narthecium*.

25th Order, *Asparagaceæ*. The Asparagus Family.—Roots fibrous or creeping; stems usually much developed, or even branching; fruit a fleshy berry; seeds with a horny or fleshy albumen. Gen. *Asparagus*, *Convallaria*, *Polygonatum*, *Maianthemum*, *Ruscus*.

26th Order, *Trilliaceæ*. The Trillium Family.—Stems upright; leaves whorled; perianth coloured or herbaceous, in six-eight divisions; fruit a three-celled, fleshy berry. Gen. *Paris*.

†† Ovary united with the perianth.

~~1st Sub-division.~~—Outer pieces of the perianth herbaceous, or somewhat coloured; inner parts coloured.

27th Order, *Hydrocharidaceæ*. The Frog-bit Family.—Floating or erect plants, with sheathing, petiolate, dilated leaves, and unisexual flowers on distinct plants; outer pieces of the perianth herbaceous, inner parts coloured; all regular (symmetrical); fruit fleshy, not opening. Gen. *Hydrocharis*, *Stratiotes*, *Anacharis*.

28th Order, *Orchidaceæ*. The Orchis Family.—Roots tuberous or fibrous and fasciculate; stem various, often leafy; leaves numerous at the base of the stem, sheathing; flowers in spikes, clusters, or corymbs; perianth irregular, often ringent; stamen and style united, or anthers and stigmas on the same column; fruit capsular, one-celled, and with very numerous seeds.

Tribe 1, *Ophrydeæ*.—Roots tuberous and fibrous; stems leafy; anthers wholly adnate with the column; pollen-masses agglutinated by viscid elastic matter. Gen. *Ophrys*, *Orchis*, *Gymnadenia*, *Habenaria*, *Aceras*, *Herminium*.

Tribe 2, *Malaxideæ*.—Roots bulbous and fibrous; anther free, not adnate; pollen-masses compact, waxy. Gen. *Malaxis*, *Liparis*, *Corallorhiza*.

Tribe 3, *Neottieæ*.—Root usually a considerable number of fleshy fibres, rarely bulbous; anther distinct from the column; pollen-masses only slightly cohering. Gen. *Neottia*, *Spiranthes*, *Goodyera*, *Listera*, *Epipactis*, *Cephalanthera*.

Tribe 4, *Cypripediceæ*.—Roots fibro-tuberous; stems solid, erect? central anther barren; lateral anthers perfect. Gen. *Cypripedium*.

29th Order, *Amaryllidaceæ*. The Amaryllis Family.—Plants usually bulbous, with erect stems, ensiform leaves, and flowers subtended by scarious bracts; perianth regular; stamens six; fruit a three-celled, many-seeded capsule. Gen. *Narcissus*, *Galanthus*, *Leucojum*.

30th Order, *Iridaceæ*. The Iris Family.—Roots fibrous or tuberous; leaves equitant (see sec. 21) in two rows; flowers in spikes, or corymbs, or panicles, or clusters, subtended by bracts; perianth in six divisions; stamens three; fruit capsular, three-celled, many-seeded. Gen. *Iris*, *Sisyrinchium*, *Trichonema*, *Crocus*.

31st Order, *Dioscoreaceæ*. The Yam Family.—Roots fleshy; stems twining; leaves with branching nerves; male and female flowers on distinct plants; stamens six; ovary three-celled, with one or two seeds in each cell. Gen. *Tamus*.

4th Class, GYMNOGENS, Lind. GYMNOSPERMS.—Floral envelopes absent; ovules naked, impregnated without the intervention of stigma and style.

32nd Order, *Coniferae*. The Pine, Fir, Larch, &c. Family.—Trees or shrubs abounding more or less in resinous juice. Stem composed of pith, wood, and bark, without medullary rays; leaves evergreen, rarely deciduous, linear, entire pointed, often acicular (needle-shaped); fruit conical, cylindrical, globular, or fleshy. (See sect. 35.)

Tribe 1, *Abietineæ*. Fir, Pine, Larch, &c.—Fruit an elongated cone or cylinder composed of woody scales, each scale bearing at its base two ovules; seeds with a membranous wing, germinating with several cotyledons. Gen. *Pinus*.

Tribe 2, *Cupressineæ*. Juniper, &c.—Trees or shrubs more or less branched; fruit more or less globular, with peltate or fleshy scales; ovules, as in *Abietineæ*, but fewer. Gen. *Juniperus*.

Tribe 3, *Taxineæ*. The Yew Tribe.—Mostly trees; fruit one-seeded; seed surrounded at the base by a fleshy cup-shaped disk. Gen. *Taxus*.

5th Class, EXOGENS, Lind. DICOTYLEDONS.—Stems with distinct wood and pith, floral envelopes various, with distinct bark; leaves jointed; stamens and ovaries always present, usually approximated, or on distinct parts of the same plant, or on distinct plants. The number five predominates in the floral organs. The seeds germinate with two cotyledons.

1st Division.—Perianth single (calyx), usually herbaceous, or reduced to one or more scales, or none.

1st Subdivision. *Amentiferae*.—The ament-bearing Families. Trees or shrubs, with rarely perfect flowers (stamens and pistils in approximation); barren flowers in round heads, or in cylindrical spikes (catkins or aments) composed of scales, which bear the stamens. Sometimes the barren flowers are enclosed in a membranous perianth. Fertile flowers solitary, clustered or in catkins, with or without a perianth; ovary usually free. Orders, *Salicaceæ*, *Corylaceæ*, *Betulaceæ*, *Myricaceæ*.

33rd Order, *Salicaceæ*. Willow Family.—Trees and shrubs; bar-

ren and fertile flowers in catkins; fruit capsular, many-seeded. Gen. *Salix*, *Populus*.

34th Order, *Corylaceæ*. Hazel, Oak, Beech, &c. Family.—Trees or shrubs; barren flowers in catkins; fertile flowers, solitary, or two-three, rarely more, in a coriaceous involucre; perianth united with the ovary; fruit one-celled and one-seeded by abortion. Gen. *Corylus*, *Quercus*, *Castanea*, *Fagus*, *Carpinus*.

35th Order, *Betulaceæ*. Birch Family.—Trees or shrubs; barren and fertile flowers in catkins; the males with several scales; fruit membranous, two-celled, with solitary ovules in each. Gen. *Betula*, *Alnus*.

36th Order, *Myricaceæ*. Gale Family.—Small trees or branching shrubs, with resinous juice; flowers on distinct plants, both barren and fertile flowers in catkins; fruit fleshy, composed of the cohering scales, one-celled, one-seeded. Gen. *Myrica*.

2nd Subdivision.—Mostly herbaceous, and rarely amentiferous plants; generally furnished with a single floral envelope or perianth (calyx), which is usually uncoloured. Orders, *Elæagnaceæ*, *Thymeliaceæ*, *Empetraceæ*.

† Ovary free.

37th Order, *Elæagnaceæ*. Oleaster Family.—Small trees or shrubs, with leprous leaves; flowers axillary, mostly imperfect; perianth tubular, persistent; ovary one-celled, one-seeded, invested with the fleshy calyx. Gen. *Hippophaë*.

38th Order, *Thymeliaceæ*. Daphne Family.—Mostly small shrubs, rarely herbs; flowers axillary or terminal, green or coloured; fruit fleshy, dry or juicy, one-celled, one-seeded. Gen. *Daphne*.

39th Order, *Empetraceæ*. Crow-berry Family.—Heath-like shrubs; flowers imperfect on different plants; fruit fleshy, three six-celled, with single ovules in each cell. Gen. *Empetrum*.

40th Order, *Euphorbiaceæ*. Spurge Family.—Herbs or shrubs abounding in acrid, milky juice; fruit composed of three, one or two-seeded carpels adhering to a central axis, and generally opening with elastic force. Sometimes two carpels constitute the fruit. Gen. *Euphorbia*, *Mercurialis*, *Buxus*.

41st Order, *Urticaceæ*. Nettle Family.—Herbs, shrubs, or trees; leaves simple, alternate, rough; flowers imperfect; fruit enveloped in the calyx, or in the axils of membranous scales, small, dry, not opening, one-seeded.

Tribe 1, *Urticeæ*.—Stems upright; leaves toothed or entire; sepals and stamens four. Gen. *Urtica*, *Parietaria*.

Tribe 2, *Cannabineæ*.—Stems climbing or erect, and annual; leaves rough, lobed; sepals and stamens five. Gen. *Humulus*, *Cannabis*.

42nd Order, *Ulmaceæ*. Elm Family.—Trees with alternate rough leaves, and deciduous stipules; fruit dry, compressed, surrounded by a membranous margin, one-two-seeded. Gen. *Ulmus*.

43rd Order, *Ceratophyllaceæ*. Horn-wort Family. — Aquatic herbs, with submerging leaves; flowers imperfect; stamens twelve-

twenty; fruit small, axillary, one-celled, one-seeded. Gen. *Ceratophyllum*.

44th Order, *Polygonaceæ*. The Sorrel, Rhubarb, Dock, and Buckwheat Family.—Herbs, rarely shrubby; stems often jointed and tumid; leaves simple, with sheathing scarious stipules; flowers very inconspicuous, green or coloured, in clusters, spikes, &c.; fruit crustaceous, covered by the persistent calyx. Gen. *Rumex*, *Oxyria*, *Polygonum*, *Fagopyrum*.

45th Order, *Chenopodiaceæ*. The Goose-foot, Beet, and Spinach Family.—Herbaceous or partly shrubby plants; leaves various, more fleshy than the leaves of the foregoing and following orders; flowers very inconspicuous, in axillary clusters or panicles, or solitary; fruit one-celled, one-seeded, covered by the permanent calyx. Gen. *Chenopodium*, *Beta*, *Atriplex*, *Halimus*, *Schoberia*, *Salsola*, *Salicornia*.

46th Order, *Amaranthaceæ*. Amaranth Family.—Herbs; leaves entire, or slightly sinuated; flowers small, green or coloured, in heads or spikes; calyx scarious; fruit membranous, one-celled, one-seeded. Gen. *Amaranthus*.

47th Order, *Callitrichaceæ*. The Water Star-wort Family.—Submerged or floating, small herbs with opposite, entire leaves; flowers naked, solitary, axillary, subtended by two bracts; fruit slightly fleshy, consisting of four one-seeded carpels, which separate when ripe, with the back keeled or winged. Gen. *Callitriche*.

† † Ovary united with the perianth (calyx).

48th Order, *Hippuridaceæ*. The Mare's Tail Family.—Aquatics; stem erect; leaves linear, whorled; flowers very small, axillary; fruit crowned by the rim of the calyx, slightly fleshy, one-celled, one-seeded. Gen. *Hippuris*.

49th Order, *Santalaceæ*. Sandal-wood Family.—Trees, shrubs, or herbs; flowers small, herbaceous, in spikes, clusters, or panicles; fruit dry, one-celled, with two-four seeds. Gen. *Thesium*.

50th Order, *Aristolochiaceæ*. Birth-wort Family.—Generally herbaceous, often climbing plants; leaves entire or sinuated, ~~entire~~, cordate at the base; flowers terminal and solitary, or axillary and solitary, or clustered; fruit capsular, six-celled, many-seeded. Gen. *Aristolochia*, *Asarum*.

2nd Division.—Perianth double (calyx and corolla both present); petals united (corollas monopetalous).

† Ovary free; calyx persistent.

51st Order, *Plantaginaceæ*. The Plantain Family.—Herbs, rarely half-shrubby plants; leaves radical, arranged in rosettes (like the petals of a double Rose), or rarely cauline, and opposite or alternate; flowers in spikes on radical peduncles, rarely solitary; fruit inclosed by the persistent calyx and corolla, one-two-four-celled, and opening by a lid; seeds one-two, or several. Gen. *Plantago*, *Littorella*.

52nd Order, *Plumbaginaceæ*. Sea Lavender and Thrift Family.—Herbs, often with branching stems; leaves spathulate, toothed, or lobed, and radical or linear; flowers in panicles or heads; calyx tubu-

lar, plaited; corolla of five petals, more or less united; fruit membranous, one-celled, one-seeded. Gen. *Statice*, *Armeria*.

53rd Order, *Primulaceæ*. The Primrose Family.—Herbs, often with radical leaves disposed in a rosette; stamens five, opposite to the petals; fruit capsular, globular, one-celled, many-seeded.

Tribe 1.—Capsule opening longitudinally by several valves. Gen. *Primula*, *Hottonia*, *Cyclamen*, *Trientalis*, *Lysimachia*, *Samolus*, *Glaux*.

Tribe 2.—Capsule opening with a lid (transverse dehiscence). Gen. *Anagallis*, *Centunculus*.

54th Order, *Lentibulaceæ*. The Butterwort Family.—Aquatics; leaves radical, in a rosette, or submerged; entire in the former case and much divided, and setaceous (like hairs) in the latter; flowers very irregular; corollas spurred and caducous; stamens two; fruit capsular, one-celled, many-seeded. Gen. *Pinguicula*, *Utricularia*.

55th Order, *Verbenaceæ*. The Vervain Family.—Trees, shrubs, or herbs; leaves opposite; flowers in spikes, or in close panicles; fruit consisting of four adherent one-seeded carpels. Gen. *Verbena*.

56th Order, *Labiataæ*. The Labiate Family.—Herbs, rarely half-shrubby plants; stems four-angled; leaves opposite, simple; flowers axillary, clustered; calyx, and corolla two-lipped; fruit four-one-seeded, free carpels.

Tribe 1, *Menthioideæ*.—Corolla, bell or funnel-shaped, with nearly equal lobes; stamens distant. Genera *Mentha*, *Lycopus*.

Tribe 2, *Salviaæ*.—Corolla bilabiate; stamens two, connective of anther-lobes very long, one cell perfect, the other barren. Gen. *Salvia*.

Tribe 3, *Thymoideæ*.—Corolla, two-lipped (bilabiate); stamens four, with divergent anthers and dilated connective. Gen. *Thymus*, *Origanum*, *Calamintha*, *Melissa*.

Tribe 4, *Lamioideæ*.—Stamens approximating, under the upper lip of the corolla.

Sub-tribe 1, *Nepeteæ*.—Calyx tubular; two inferior stamens shortest. Gen. *Nepeta*.

Sub-tribe 2, *Stachydeæ*.—Two lower stamens longest; calyx tubular or bell-shaped, spreading in fruit. Gen. *Melittis*, *Lamium*, *Leonurus*, *Galeopsis*, *Stachys*, *Ballota*, *Murrubium*.

Sub-tribe 3.—Two lower stamens longer than the upper two; calyx closed when in fruit. Gen. *Scutellaria*, *Prunella*.

Tribe 5, *Ajugoideæ*.—Upper lip indistinct, two-parted, with diverging lobes, which appear to belong to the lower lip; stamens elongated above the corolla; lower pair the longest. Gen. *Ajuga*, *Teucrium*.

57th Order, *Scrophulariaceæ*. Figwort Family.—Herbs, rarely somewhat shrubby; leaves opposite, whorled, scattered, or alternate; flowers solitary and axillary, or in clusters, and leafy spikes; corollas irregular, caducous; stamens four, one being abortive, rarely two; fruit capsular, two-celled, many-seeded: Corolla rotate, with rather unequal lobes, Gen. *Veronica*, *Sibthorpia*: Corolla bell-shaped,

Digitalis, *Limosella*: Corolla personate, *Antirrhinum*, *Linaria*; Corolla ringent, *Pedicularis*, *Rhinanthus*, *Bartsia*: Corolla open, tubular, or bell-shaped, *Scrophularia*, *Eufragia*, *Euphrasia* (all many seeded): Corolla ringent, *Melampyrum* (few seeded).

58th Order, *Orobanchaceæ*. The Broom-Rape Family.—Parasitic, succulent herbs, with upright, scaly stems, and no leaves; never green; flowers in spikes; corolla irregular; stamens four; fruit a one-celled, many-seeded capsule. Gen. *Orobanche*, *Lathræa*.

59th Order, *Verbascaceæ*. Mullein Family.—Herbs with tall, erect leafy stems, and simple (mostly decurrent) leaves; flowers in spiked and branching panicles; corolla rotate, slightly unequal, with a five-cleft limb; stamens five, unequal, with adnate anthers; fruit capsular, two-celled, many seeded. Gen. *Verbascum*.

60th Order, *Solanaceæ*. Nightshade Family.—Herbs, sometimes slightly shrubby; leaves alternate, entire, or lobed; flowers on axillary or terminal flower-stalks; corolla rotate, campanulate, or funnel-shaped; stamens five, equal; fruit capsular or berried, opening variously.

Tribe 1; *Solanææ*. Fruit succulent, not opening. Gen. *Solanum*, *Atropa*.

Tribe 2, *Hyoscyameæ*.—Fruit dry, opening by a lid or by valves. Gen. *Hyoscyamus*, *Datura*.

61st Order, *Boraginaceæ*. Borage Family.—Herbs, seldom slightly ligneous; leaves alternate, rough; flowers in one-sided terminal spikes (gyrate); corolla five-rarely four-cleft; fruit four one-seeded carpels.

Tribe 1, *Anchuseæ*.—Carpels distinct, inserted in the base of the calyx, with a flat surface, or with a more or less prominent rim at the base. Gen. *Anchusa*, *Borago*, *Lycopsis*, *Symphytum*, *Myosotis*, *Lithospermum*, *Pulmonaria*, *Echium*.

Tribe 2, *Cynoglosseæ*.—Carpels attached to the central column (base of the style) by a lateral, flat, or flattish face. Gen. *Cynoglossum*, *Asperugo*.

62nd Order, *Cuscutaceæ*. Dodder Family.—Parasitic leafless plants, with filiform (thread-like) or capillary (hair-like) twining stems, supported by other plants; flowers minute in clusters; fruit capsular, membranous, two-celled, one-seeded by abortion. Gen. *Cuscuta*.

63rd Order, *Convolvulaceæ*. Bindweed Family.—Herbs yielding acrid juice; stems usually twining; leaves alternate, petiolate, simple; flowers large, axillary, solitary, or in small groups, on axillary peduncles; fruit capsular, two-three-four celled, with two seeds, or one only in each cell. Gen. *Convolvulus*.

64th Order, *Polemoniaceæ*. Greek Valerian Family.—Herbs, with opposite or alternate leaves; corolla five-lobed; stamens five; stigma three-cleft; fruit capsular, three-celled. Gen. *Polemonium*.

65th Order, *Gentianaceæ*. Gentian Family.—Herbs, quite smooth, yielding a bitter juice; leaves usually opposite, entire, rarely trifoliate; flowers in clusters, or in cymes, or in corymbs, or panicles, sometimes solitary, lateral or terminal; corolla persistent, twisted in preflora-

tion; fruit one- or incompletely two-celled, two-valved, many seeded.

Tribe 1, *Menyantheæ*.—Leaves alternate; corolla valvate-induplicate in prefloration. Gen. *Menyanthes*, *Villarsia*.

Tribe 2, *Gentianeæ*.—Leaves opposite; corolla twisted in prefloration. Gen. *Gentiana*, *Cicendia*, *Chlora*, *Erythræa*.

66th Order, *Apocynaceæ*. Periwinkle Family.—Small trees, or low shrubs, with entire opposite coriaceous leaves; flowers large, axillary, and solitary, or in terminal corymbs; corolla five-lobed, twisted in prefloration; fruit consisting of two many-seeded capsular carpels (*follicles*). Gen. *Vinca*.

67th Order, *Oleaceæ*. Lilac and Ash Family.—Trees or shrubs; leaves opposite, entire, or pinnate; flowers in panicles; corolla four-parted, or cleft, or absent; stamens two; fruit fleshy, or coriaceous, opening or not opening, one- or two-celled, cells, one- or two-seeded. Gen. *Ligustrum*, *Fraxinus*.

68th Order, *Aquifoliaceæ*. Holly Family.—Small trees; leaves leathery, evergreen, alternate, with spinous teeth; flowers in axillary clusters; corolla usually four-parted, imbricate in prefloration; fruit fleshy, containing four one-seeded bony cells. Gen. *Ilex*.

69th Order, *Ericaceæ*. Heath Family.—Very small branching trees or shrubs; leaves usually whorled, leathery, persistent; flowers in panicles or terminal clusters; corolla bell- or pitcher-shaped; stamens eight-ten, not borne by the corolla; fruit capsular, four-five-celled, many seeded.

Tribe 1, *Ericææ*.—Fruit dry, capsular. Gen. *Erica*, *Calluna*, *Andromeda*, *Phyllodoce*, *Dobæciæ*, *Azalea*.

Tribe 2, *Arbuteæ*.—Fruit fleshy. Gen. *Arbutus*, *Arctostaphylos*.

†† Ovary more or less united with the calyx.

70th Order, *Vacciniaceæ*. Whortleberry or Bilberry Family.—Small shrubs; leaves leathery, evergreen, or deciduous, alternate, or scattered; flowers axillary and solitary, or in terminal groups; calyx of from four to five sepals, united in a tube; corolla campanulate, urceolate, or rotate, inserted in the calyx-tube, four-five parted; fruit a berry crowned with the teeth of the calyx. Gen. *Vaccinium*, *Oxycoccus*.

71st Order, *Campanulaceæ*. Bell-flower Family.—Herbs, generally yielding milky juice, more or less acrid; leaves alternate, or scattered, simple; flowers in clusters, spikes, heads, &c.; corolla campanulate, rotate, or tubular, variously cleft, or parted; stamens five; fruit capsular, crowned by the persistent calyx, with two, three, and rarely five cells, and with several seeds in each cell.

Tribe 1, *Campanulææ*.—Corolla regular; stamens distinct; style hairy. Gen. *Campanula*, *Specularia*, *Wahlenbergia*, *Phyteuma*, *Jasione*.

Tribe 2, *Lobeliææ*.—Corolla irregular; stamens united; style glabrous, with a single tuft of hair below the stigma. Gen. *Lobelia*.

72nd Order, *Compositæ*. Composite Family.—A very large order of herbaceous or partly shrubby plants; leaves usually alternate, simple,

or variously divided; flowers sessile on a common receptacle, and surrounded by an involucre; corollas tubular or strap-shaped, regular or irregular; fruit dry, not opening, one-celled, one-seeded.

1st Sub-family, *Tubulifloræ*.—Florets tubular, at least the central ones.

Sub-division 1, *Cynarocephalæ*.—Florets all tubular and perfect, except sometimes the ray-florets; style swollen above.

Tribe 1.—Plume of long fibres, rough or feathery, connected at the base by a ring, falling off in one mass. Gen. *Onopordum*, *Carlina*, *Carduus*, *Silybum*, *Centaurea*.

Tribe 2.—Plume either persistent or falling off gradually, rarely united in a laciniated crown. Gen. *Lappa*, *Serratula*, *Saussurea*.

Sub-division 2, *Corymbifera*.—Flowers of the centre tubular, perfect, of the ray (circumference), strap-shaped, sometimes sterile. In some genera the florets are all tubular; style not enlarged above.

Tribe 1.—Receptacle scaly; fruit without a plume; anthers without appendages at the base. Gen. *Bidens*, *Achillea*, *Anthemis*.

Tribe 2.—Receptacle not chaffy; fruit without a plume; anthers usually without basilar appendages.

Sub-tribe.—Anthers without appendages at the base. Gen. *Pyrethrum* (*Matricaria*), *Chrysanthemum*, *Bellis*, *Artemisia*, *Tanacetum*. There are no British representatives of the other sub-tribes of this tribe.

Tribe 3.—Receptacle chaffy only at the circumference; fruit crowned with silky fibres.

Sub-tribe 1.—Anthers with appendages at the base. Gen. *Filago*, *Gnaphalium*, *Antennaria*, *Pulicaria*, *Inula*.

Sub-tribe 2.—Anthers without appendages at the base. *Solidago*, *Erigeron*, *Aster*, *Linosyris* (*Chrysocoma*), *Doronicum*, *Cineraria*, *Senecio*, *Eupatorium*, *Tussilago*, *Petasites*.

2nd Sub-family, *Ligulifloræ*.—Florets all strap-shaped and perfect.

Tribe 1.—Fruit without a capillary plume, with or without a rim, or with a very short, paleaceous, membranous crown. Gen. *Lapsana*, *Arnoseris*, *Cichorium*.

Tribe 2.—Fruit, at least in the centre, crowned with feathery fibres, or the exterior fibres only smooth. Gen. *Hypochaeris*, *Thrinacia*, *Leontodon*, *Picris*, *Helminthia*, *Tragopogon*.

Tribe 3.—Plume of the fruit capillary, either smooth or rough, but not feathery. Gen. *Taraxacum*, *Lactuca*, *Sonchus*, *Mulgedium*, *Crepis*, *Hieracium*.

Sub-order *Ambrosiaceæ*, *Link.*—Flowers capitate in spikes, upper heads containing male flowers, the lower, female ditto; fruit one-celled, one-seeded enclosed in a woody involucre. Gen. *Xanthium*.

73rd Order, *Dipsacæ*. Teasel and Scabious Family.—Herbs; leaves opposite; flowers in heads on a conical receptacle subtended by a leafy involucre; corolla tubular funnel-shaped; four-five cleft, lobes

unequal, in a membranous calyx; fruit dry, crowned by the remains of the calyx. Gen. *Dipsacus*, *Scabiosa*, *Knautia*.

74th Order, *Valerianaceæ*. Valerian Family.—Herbs, often with fleshy odorous roots; radical leaves in a rosette or fascicled; stem-leaves opposite, simple or compound; flowers in cymes arranged in a corymb; corolla tubular funnel-shaped, regular, gibbous, or spurred; lobes nearly equal; fruit one-celled, one-seeded, or three-celled, one of which only is fertile. Gen. *Valeriana*, *Centranthus*, *Valerianella*.

75th Order, *Rubiaceæ* (*Stellatæ*). Madder and Galium Family.—Herbs (Br. Sp.); stems four-angled; leaves sessile, whorled; flowers in lateral or terminal, two- or three-parted cymes, or paniced or corymbose; corolla four-five cleft; stamens four-five; fruit dry, rarely fleshy, composed of two nearly globular carpels. Gen. *Rubia*, *Asperula*, *Galium*, *Sherardia*.

76th Order, *Caprifoliaceæ*. Honeysuckle Family.—Small trees, shrubs, or herbs; leaves opposite, entire or variously lobed or divided; flowers in cymes, heads or apparent verticils, rarely binary, on axillary peduncles; corolla tubular, two-lipped, bell-shaped, or rotate, five- rarely four-cleft; fruit fleshy, three-five celled, or one-celled by abortion, one- or few-seeded.

Tribe 1, *Sambucineæ*.—Corolla rotate; fruit three-five-celled, three-five seeded; styles three-five, or three-five sessile stigmas. Gen. *Adoxa*, *Sambucus*, *Viburnum*.

Tribe 2, *Lonicereæ*.—Corolla tubular or campanulate, with a two-lipped or five-cleft limb; fruit one-celled, with several seeds; style one; stigma three-lobed. Gen. *Lonicera*, *Linnaea*.

77th Order, *Cucurbitaceæ*. Cucumber Family.—Herbs, mostly succulent; stems climbing; leaves alternate, simple, palmate, rough; flowers axillary, either solitary, fascicled, or corymbose; corolla bell-shaped or wheel-shaped, five-cleft or five-parted persistent; stamens five; fruit fleshy, or a berry, three-five-celled, or fewer by the destruction of the partitions. Gen. *Bryonia*.

3rd Division.—Perianth double (calyx and corolla present); petals distinct (polypetalous).

1st Subdivision.—Petals and stamens inserted on the calyx (perigynous).

† Ovary more or less united with the calyx.

78th Order, *Hederaceæ* (*Araliaceæ*). Ivy Family.—Shrubs, often climbing; leaves alternate, lobed; flowers in lateral or terminal umbels; petals five, valvate in prefloration; stamens five; fruit a five-celled five-seeded berry. Gen. *Hedera*.

79th Order, *Cornaceæ*. Cornel Family.—Small trees, with opposite leaves; flowers in cymes, corymbs, or umbels; petals and stamens four; fruit fleshy, consisting of two one-seeded cells. Gen. *Cornus*.

80th Order, *Loranthaceæ*. Mistletoe Family.—Parasitic shrubs; stem very much branched; leaves opposite, simple, quite entire; flowers sessile, in groups, imperfect; the fertile flower has four small fleshy petals; the barren flower has four stamens attached to the sepals; fruit a mucilaginous one-seeded berry. Gen. *Viscum*.

81st Order, *Grossulaceæ*. Gooseberry and Currant Family.—Shrubs with or without spines; leaves alternate or fascicled, lobed; flowers axillary, in clusters; petals small, five, rarely four; fruit a many-seeded berry. Gen. *Ribes*.

82nd Order, *Saxifragaceæ*. Saxifrage Family.—Herbs, with generally hairy or glandular stems and simple crenate, toothed, or palmate leaves; flowers in cymes or in terminal corymbs; petals five; stamens ten, rarely eight; fruit capsular, two-celled, many-seeded, rarely one-celled; the carpels separate when ripe. Gen. *Saxifraga*, *Chrysosplenium*.

83rd Order, *Umbelliferae*. Umbellate Family.—Herbs with usually a powerful odour, agreeable or disagreeable; stem generally channelled, more or less sharply ridged, often hollow; leaves sheathing, simple or compound; flowers in simple or compound umbels, axillary or terminal, or both; petals and stamens five; styles two; fruit composed of two one-seeded carpels.

Sub-order 1, *Orthospermæ*.—Carpels either flat or convex on the face (where they adhere to the central column).

Tribe 1.—Umbels imperfect; flowers sessile, or almost sessile, or in heads. Gen. *Hydrocotyle*, *Sanicula*, *Eryngium*, *Astrantia*.

Tribe 2.—Umbels compound; fruit almost cylindrical, compressed in the direction of the axis (central column); carpels without spines; primary ridges equal, or nearly so, filiform, or more or less elevated; secondary ridges none. Gen. *Bupleurum*, *Trinia*, *Sison*, *Cicuta*, *Ægopodium*, *Carum*, *Petroselinum*, *Apium*, *Helosciadium*, *Sium*, *Pimpinella*, *Conopodium* (*Bunium*), *Æthusa*, *Oenanthe*, *Libanotis*, *Feniculum*, *Cnidium*, *Silaus*.

Tribe 3.—Fruit compressed in the same direction as the axis, without spines; carpels with unequal primary ridges; the three dorsal filiform, the two marginal winged. Gen. *Selinum*, *Angelica*, *Peucedanum*, *Pastinaca*, *Heracleum*, *Tordylium*.

Tribe 4.—Fruit compressed in the same direction as the axis, or nearly cylindrical; carpels five; primary ridges filiform, with or without spines; the four secondary ridges become wings, either entire or deeply cleft, or parted into spines or spinous fibres. Gen. *Daucus*.

Sub-order 2, *Campylospermæ*.—Face of the carpels furrowed by the inflexure of the margin. Gen. *Caucalis*, *Torilis*, *Anthriscus*, *Chærophyllum*, *Scandix*, *Conium*.

Sub-order 3, *Cælospermæ*.—Carpels curved inwards. Gen. *Coriandrum*.

84th Order, *Haloragaceæ*. Water-mill foil Family.—Aquatic submerged or swimming plants; leaves whorled, much divided, segments capillary; calyx-limb four-parted, or almost none; petals four or none; stamens equal to or twice as many as the lobes of the calyx; fruit hard, four-celled, or one-celled by abortion.

Tribe 1, *Myriophylleæ*.—Stamens eight, rarely four; ovary four-celled; stigmas four, sessile. Gen. *Myriophyllum*.

85th Order, *Onagraceæ*. Evening Primrose Family.—Herbs, some-

times a little shrubby at the base. Leaves simple, entire, or toothed; flowers axillary, solitary, or in terminal clusters; petals four, or none; stamens eight, rarely four or two; fruit capsular, four-celled, four-valved, or two-celled, one-seeded, not opening.

Tribe 1, *Onagrarieæ*.—Fruit long, more or less quadrangular. Gen. *Epilobium*, *Oenothera*, *Isnardia*.

Tribe 2, *Circææ*.—Petals and stamens two; fruit, two one-seeded cells. Gen. *Circæa*.

86th Order, *Pomaceæ*. Apple-tree Family.—Trees or shrubs; branches often spinous; leaves scattered or fascicled, simple and toothed, or lobed or pinnate; flowers in umbels, clusters, or corymbs, often fugitive; petals five: stamens indefinite; styles five, or fewer by abortion; fruit crowned by the limb of the calyx, fleshy, with as many cells as stamens.

Tribe 1.—Lining of the cells bony. Gen. *Mespilus*, *Cratægus*.

Tribe 2.—Lining of the cells cartilaginous. Gen. *Cotoneaster*, *Pyrus*, *Sorbus*.

† † Ovary free.

87th Order, *Amygdalaceæ*.—Trees or shrubs, with simple alternate leaves, and often glandular stipules; calyx, five-toothed, deciduous; petals five; stamens about twenty. Fruit, a fleshy drupe, with a hard bony nut. Gen. *Prunus*.

88th Order, *Rosaceæ*. Rose Family.—Herbs, or sometimes prickly shrubs; leaves alternate, pinnate, rarely simple; flowers in cymes or corymbs, both kinds of inflorescence more or less irregular; petals five, rarely four; stamens indefinite; carpels indefinite, distinct, rarely few, or only one or two in a head, or in a hemispherical or conical receptacle.

Tribe 1, *Spirææ*.—Carpels few, dry, in a single whorl, opening by the inner margin (ventral suture), two-six-seeded; stamens indefinite. Gen. *Spiræa*.

Tribe 2, *Potentilleæ*.—Carpels numerous, not opening (indehiscent), one-seeded, on a conical, dry, or fleshy receptacle; stamens indefinite. Gen. *Potentilla*, *Sibbaldia*, *Comarum*, *Fragaria*, *Rubus*, *Geum*, *Dryas*.

Tribe 3, *Rosææ*.—Carpels numerous, dry, not opening, enclosed in the calyx, which becomes fleshy when the fruit is ripe; stamens indefinite. Gen. *Rosa*.

Tribe 4, *Agrimoniææ*.—Carpels one-two, dry, not opening, shut up in the calyx-tube, which is indurated when the fruit is ripe. Gen. *Agrimonia*. ~ *Arenaria*

89th Order, *Crassulaceæ*. House Leek Family.—Herbaceous, or somewhat shrubby at the base; leaves in ranks, or scattered, fleshy, often cylindrical; flowers in spikes, or corymbs, or cymes; sepals five, rarely three-twenty; corolla five, rarely three-twenty petals; fruit of as many carpels as the flower has petals, opening by the inner margin. Gen. *Sedum*, *Sempervivum*, *Tillæa*.

90th Order, *Illecebraceæ*. Knot-grass Family.—Herbs, with numerous slender, often prostrate, stems; leaves opposite or scattered,

entire, with scarious stipules; flowers often minute, in terminal heads or cymes, rarely axillary; calyx five sepals, rarely four, free or cohering; petals as many as the sepals, often rudimentary; stamens five, rarely four; fruit one-celled, one-seeded by abortion; seed suspended on a basal funicle. Gen. *Polycarpon*, *Corrigiola*, *Scleranthus*, *Illecebrum*, *Herniaria*.

91st Order, *Portulacæ*. Purslane Family.—Mostly succulent annual herbs, with branching stems; leaves opposite, or scattered; flowers small, solitary, or aggregate, terminal or lateral; sepals two, rarely three or five; petals five, rarely four or six; stamens three-twelve; the fruit is a membranous one-celled capsule opening with a lid, or three-valved, opening by the sutures. Gen. *Montia*. *Claytonia*

92nd Order, *Lythraceæ*. Loose-strife Family.—Herbaceous plants, or sometimes shrubby at the base; leaves entire; flowers axillary, solitary, or aggregate; lobes of calyx eight-twelve, rarely more; corolla four-six petals, rarely seven, inserted at the top of the calyx-tube; stamens six-twelve, rarely more or fewer; fruit capsular, two-celled, rarely with more cells; cells many-seeded, opening irregularly, or by the sutures. Gen. *Lythrum*, *Peplis*.

93rd Order, *Leguminiferae*. Legume-bearing Family, Pea, Bean, &c. Family.—Herbs, shrubs, or trees; leaves alternate, variously divided, stipulate; flowers in upright or pendent clusters, in heads or in umbels, sometimes solitary; corolla irregular (see sect. 27, p. 25); stamens ten, either all united, or nine united and one free; fruit a legume (see sect. 37).

Tribe 1, *Loteæ*.—Leaves unequally pinnate (see sect. 18, Fig. 44), or trifoliate, rarely simple, or a mere rach by abortion; cotyledons rising above ground and becoming leaves; legume continuous, or sometimes twisted or spiral, rarely imperfectly two-celled.

Sub-tribe 1.—Stamens all united. Gen. *Sarothamnus*, *Genista*, *Ulex*, *Ononis*, *Anthyllis*.

Sub-tribe 2.—Stamens nine united, one free; leaves trifoliate. Gen. *Lotus*, *Melilotus*, *Medicago*, *Trifolium*.

Sub-tribe 3.—Stamens all united (Diadelphous); leaves pinnate, with an odd leaflet; legume imperfectly two-celled by the inflexion of the dorsal nerve. Gen. *Oxytropis*, *Astragalus*.

Tribe 2, *Vicieæ*.—Legume one-celled, sometimes divided by transverse partitions; stamens either all united, or with one distinct; cotyledons remaining under ground; leaves equally pinnate, often furnished with a tendril, rarely reduced to a rach, tendril or phyllode (petiole without a leaf). Gen. *Vicia*, *Lathyrus*, *Orobus*.

Tribe 3, *Hedysareæ*.—Legume transversely divided into one-seeded cells; stamens united; leaves unequally pinnate. Gen. *Ornithopus*, *Arthrolobium*, *Hippocrepis*, *Onobrychis*.

94th Order, *Rhamnaceæ*. Buckthorn Family.—Small trees or shrubs; leaves alternate or fascicled, entire or toothed; flowers axillary, in fascicles, or nearly solitary, towards the end of the branch; petals four-five, or none by abortion; stamens four-five opposite to

the petals; fruit a globular berry, containing from two to four coriaceous, cartilaginous nuts. Gen. *Rhamnus*.

2nd *Subdivision*.—Petals and stamens inserted on the receptacle.

Ovary free.

† Placentation parietal (seeds attached to the valves or to their margins).

95th Order, *Violaceæ*. Violet Family.—Herbs or shrubs; leaves alternate or all radical, petiolate, entire, toothed, or crenated; flowers solitary, pedunculate; corolla of five unequal petals, the lower one with a spur, twisted in prefloration; fruit capsular, one-celled, three-valved, many-seeded. Gen. *Viola*.

96th Order, *Cistaceæ*. Cistus Family.—Shrubs, partly shrubby or herbaceous plants, with opposite entire leaves, rarely with scattered leaves; flowers in gyrate, terminal groups, rarely in umbellate cymes or solitary; petals five, fugitive; stamens indefinite; fruit capsular, one-celled, three-five, rarely six-ten imperfect cells. Gen. *Helianthemum*.

97th Order, *Cruciferae*. Cruciate Family.—Herbs, rarely shrubby at the base; leaves alternate, simple, or variously divided; flowers in clusters, often corymbose; petals four, caducous; stamens six, unequal; fruit dry, elongated or short, opening by both the margins of the valves, two-celled, with many, or few, or solitary seeds.

Sub-order *Siliculosæ*.—Fruit, a linear or lanceolate opening, many-seeded pod, rarely not opening.

Tribe 1.—Cotyledons flat, radicle lateral (placed at the edges of the cotyledons). Gen. *Matthiola*, *Cheiranthus*, *Barbarea*, *Arabis*, *Dentaria*, *Cardamine*, *Nasturtium*, *Turritis*.

Tribe 2.—Radicle dorsal, *i. e.* lying on the back of one of the cotyledons. Gen. *Hesperis*, *Erysimum*, *Alliaria*, *Sisymbrium*.

Tribe 3.—Cotyledons folded (conduplicate), radicle dorsal, included in the folded cotyledons. Gen. *Brassica*, *Sinapis*, *Erucastrum*, *Diplotaxis*.

Sub-order 2, *Siliculosæ*.—Fruit about equal in length and breadth, a pouch (silicle) oval, oblong, or round, or cordate; opening (dehiscent) rarely not-opening (indehiscent); seeds one-four or many.

Tribe 1.—Silicle dehiscent.

Sub-tribe 1.—Silicle compressed parallel to the partition; partition broad; valves flat or convex, never keeled or winged. Gen. *Alyssum*, *Draba*, *Cochlearia*, *Camelina*, *Vella*.

Sub-tribe 2.—Silicle compressed perpendicularly to the partition; partition narrow, linear, or lanceolate; valves boat-shaped, often keeled or winged. Gen. *Teesdalia*, *Thlaspi*, *Iberis*, *Hutchinsia*, *Capsella*, *Lepidium*, *Subularia*.

Tribe 2. Silicle not opening. Gen. *Senebiera*, *Isatis*.

Tribe 3.—Fruit divided into distinct indehiscent cells by transverse partitions. Gen. *Cakile*, *Crambe*, *Raphanus*.

98th Order, *Fumariaceæ*. Fumitory Family.—Herbs, mostly juicy and glaucous; leaves alternate, much divided; flowers in terminal clusters, or in clusters opposite to the leaves petals four, connivent,

more or less united at the base, the upper one spurred; stamens six, united by their filaments in two bundles; fruit either one-celled and one-seeded, not opening, or many-seeded, two-valved, opening. Gen. *Fumaria*, *Corydalis*.

99th Order, *Papaveraceæ*. Poppy Family.—Herbs, with milky-white or yellow juice; leaves alternate, sinuated, pinnatifid, or pinnate; flowers in umbels, or solitary; petals four, fugitive; stamens indefinite; fruit dry, globular or elongated, one-celled, with incomplete partitions, many-seeded, opening by pores under the radiate stigma; or linear one-celled, with an imperfect partition opening by two valves, or not opening, and divided into several cells by transverse partitions. Gen. *Papaver*, *Meconopsis*, *Reimeria*, *Glaucium*, *Chelidonium*.

100th Order, *Nymphæaceæ*.—Herbs, with cordate or peltate thick floating leaves; sepals and petals numerous, the latter inserted on the disk which surrounds the pistil. Gen. *Nymphæa*, *Nuphar*.

101st Order, *Resedaceæ*. Yellow Rocket Family.—Herbs with alternate entire or variously divided leaves; flowers in spicate terminal clusters; petals four-seven, unequal; stamens ten-thirty; fruit capsular, many-seeded, opening at the summit. Gen. *Reseda*.

102nd Order, *Droseraceæ*. Sundew Family.—Leaves mostly radical in a rosette, usually furnished with long glandular hairs; petals and stamens five each, rarely four; fruit capsular, with three-five cells, rarely more or fewer; valves three-five, many seeds. Gen. *Drosera*, *Parnassia*.

103rd Order, *Hypericaceæ*. Tutsan or St. John's Wort Family.—Herbs, often shrubby plants; stems often with prominent angles; leaves opposite, entire, often with glandulous, transparent punctures; flowers yellow, in panicles, corymbs, or cymes; petals five, rarely four; stamens indefinite, united at the base in three-five bundles; fruit capsular, three-five celled, three-five valved, many-seeded, rarely a berry. Gen. *Hypericum*.

†† Placentation axile or central (except *Tamaricaceæ* and *Frankeniaceæ*); seeds attached to the centre of the capsule, or to a central column or receptacle.

104th Order, *Pyrolaceæ*. Winter Green Family.—Herbs, rarely shrubby plants; leaves mostly radical, in a rosette, entire or toothed; flowers in terminal clusters; petals five, more or less cohering; stamens double the number of the petals; fruit capsular, three-five celled with three-five valves and numerous seeds. Gen. *Pyrola*, *Moneses*.

105th Order, *Monotropaceæ*. Monotropa Family.—Succulent pale herbs, with scales instead of leaves; flowers pale, in a terminal, one-sided cluster; petals four-five; stamens eight-ten; fruit-capsular four-five celled, with many seeds. Gen. *Monotropa*.

106th Order, *Celastraceæ*. Spindle-tree Family.—Shrubs or small trees; leaves opposite, toothed, or nearly quite entire; flowers in axillary cymes; petals four-five inserted on a thick annular disk; stamens as many as the petals; fruit capsular, cartilaginous, with

three-five cells, two- or one-seeded by abortion; seeds sometimes with a coloured, fleshy aril. Gen. *Euonymus*, *Staphylea*.

107th Order, *Aceraceæ*. Maple Family.—Trees or shrubs; leaves opposite, petiolate, lobed, or palmate; flowers, either in erect corymbs or in pendulous clusters; sepals five, rarely four-nine, disk thick, annular; petals as many as the sepals; stamens usually eight inserted on the disk; fruit consisting of two one-seeded, rarely two-seeded, winged samaras. Gen. *Acer*.

108th Order, *Polygalaceæ*. Milk-wort Family.—Shrubs, often herbs, somewhat shrubby at the base; leaves sessile, entire, alternate, rarely opposite; flowers in spicate, terminal clusters; calyx of five very unequal sepals, three of which are very small and herbaceous, two large and coloured; corolla irregular, of three very unequal petals cohering through the united filaments; stamens eight in two bundles; fruit capsular, membranous, two-celled, compressed perpendicularly to the partition. Gen. *Polygala*.

109th Order, *Tiliaceæ*. Lime-tree Family.—Trees with alternate simple petiolate, stipulate leaves; flowers in axillary corymbs, on a common winged peduncle; petals five, imbricate in prefloration; stamens indefinite; fruit woody, five-angled, one-celled by the rupture of the partitions, and one two-seeded by abortion. Gen. *Tilia*.

110th Order, *Malvaceæ*. Mallow Family.—Herbs or shrubs, or shrubby only at the base; leaves alternate, petiolate, lobed, or variously divided, stipulate; flowers solitary, or in fascicles, axillary or terminal; sepals five, rarely three-four, united at the base; petals five, clawed and united with the base of the staminal tube; stamens indefinite in a tube which covers the ovary; fruit a number of one-seeded carpels, arranged on a central axis. Gen. *Malva*, *Althæa*, *Lavatera*.

111th Order, *Geraniaceæ*. Geranium Family.—Herbs, or somewhat shrubby plants; stems more or less tumid and jointed; leaves opposite below, and alternate above, with usually membranous stipules; flowers usually in twos, pedunculate, sometimes one or several on the common peduncle, opposite to the leaves; petals five, equal or unequal, fugitive; stamens ten united; fruit five one-celled carpels radiating and adhering to a central column. Gen. *Geranium*, *Erodium*.

112th Order, *Balsaminaceæ*. Balsam Family.—Herbs with succulent stems more or less tumid at the joints; leaves alternate, simple, nearly entire; flowers single, or several on axillary peduncles; sepals five, very unequal, coloured and fugitive; petals four, unequal, small; stamens five, filaments united about half their length; fruit incompletely five-celled and five-valved, separating elastically. Gen. *Impatiens*.

113th Order, *Oxalidaceæ*. Wood Sorrel Family.—Herbs, more or less acid; leaves involute in the bud (circinate in vernalion) (see § 21), trifoliate, stipulate; flowers several on axillary peduncles, or solitary and radical; petals five, sometimes cohering at their base; stamens ten, united at the base; capsule five-celled, many-seeded, rarely with solitary seeds. Gen. *Oxalis*.

114th Order, *Elatinaceæ*. Water-pepper Family.—Herbaceous, rooting, aquatic plants, with hollow stems and opposite, or whorled, entire leaves and minute scarious stipules; flowers axillary; petals three-four fugitive; stamens as many or twice as many as the petals; fruit capsular, three-four celled, many-seeded, crowned by the styles. Gen. *Elatine*.

115th Order, *Linaceæ*. Flax Family.—Herbs, sometimes shrubby at the base; stems branching; leaves entire, sessile, scattered; flowers terminal or lateral, in cymes or panicles; petals five, rarely four; very fugitive; stamens five-four, slightly uniting at the base; fruit capsular, five-rarely three-four-celled, each cell forming a one-seeded separable carpel. Gen. *Linum*, *Radiola*.

116th Order, *Caryophyllaceæ*. Pink Family.—Herbs, rarely shrubby at the base; stems jointed and tumid, usually forked; leaves opposite, entire, often sessile, or connate, at the base; flowers either in terminal forked cymes, which are sometimes one-sided by abortion or in terminal clusters, panicles, or solitary; petals five, rarely four, very rarely absent; stamens as many or twice as many as the petals; fruit capsular, one-celled, or rarely with two-five imperfect cells, opening by valves or by teeth; very rarely fleshy, and not opening.

Sub-order 1, *Sileneæ*.—Sepals united into a tube for half their length; petals with claws as long as the calyx-tube; ovary stipitate. Gen. *Dianthus*, *Saponaria*, *Silene*, *Cucubalus*, *Melandrium*, *Lychnis*.

Sub-order 2. *Alsineæ*.—Sepals free; petals sessile, with a very short claw, sometimes none by abortion; ovary sessile. Gen. *Lepigonum*, *Spergula*, *Sagina*, *Alsine*, *Cherleria*, *Arenaria*, *Holosteum*, *Stellaria*, *Cerastium*.

117th Order, *Frankeniaceæ*. Sea Heath Family.—Herbs, or somewhat shrubby plants; leaves opposite, sheathing at the base; flowers sessile, axillary, or terminal; petals five clawed, with appendages at the base of the limb; stamens five or more; fruit capsular, one-celled, two-three-four-valved, many seeded. Gen. *Frankenia*.

118th Order, *Tamaricaceæ*. Tamarix Family.—Shrubs or herbs; leaves alternate, entire, scale-like; flowers in spikes or racemes; calyx four-five parted; petals four-five; stamens as many or twice as many as the petals; fruit capsular, one-celled, three-valved, many-seeded. Gen. *Tamarix*.

119th Order, *Berberaceæ*. Berberry Family.—Shrubs or herbs; leaves compound, alternate with spinous teeth; flowers in simple racemes, rarely panicled; sepals three-four-six in two rows, one of which is deciduous and coloured; petals as many or twice as many as sepals; stamens as many as the petals, and opposite; fruit a one-seeded berry or capsule, with more than one seed. Gen. *Berberis*.

120th Order, *Ranunculaceæ*. Crow-foot Family.—Herbs, rarely shrubs, or half shrubby plants; leaves alternate, petiolate, and sheathing at the base, entire, simple, or variously divided; calyx either coloured and fugitive, or herbaceous and persistent; petals five to fifteen, regular or irregular, rarely absent; stamens indefinite, very

rarely e-ten (*Myosurus*); fruit composed of definite or indefinite carpels, or not or indehiscent.

Older *Patideæ*.—Leaves opposite; Corolla absent; prefloration; petals; anthers extrorse; carpels one-seeded, not opening, with or in pendulous appendage (tail). Gen. *Clematis*.

lar; *Ranunculeæ*.—Leaves alternate, or all radical; sepals; petals absent in *Thalictrum* and *Anemone*, imbricate in; anthers extrorse; carpels indefinite, one-seeded, not opening, and without a tail. Gen. *Thalictrum*, *Anemone*, *Adonis*, *Myadris*, *Ranunculus*, *Ficaria*.

Tribe 3. *Helleboreæ*.—Leaves alternate, or all radical; calyx mostly coloured and fugitive, rarely persistent; petals more or less irregular, or absent; prefloration imbricated; carpels three-ten, many-seeded, opening by the inner margin. Gen. *Caltha*, *Trollius*, *Helleborus*, *Eranthis*, *Aquilegia*, *Delphinium*, *Aconitum*.

Tribe 4. *Pæoniæ*.—Leaves alternate; petals four-five, or more; anthers introrse; carpels two-five or solitary, many-seeded and opening, or berried and not opening. Gen. *Pæonia*, *Actæa*.



Fig. 99.—Flower of *Pancratium illyricum*, amaryllidaceous plant; o, ovary.

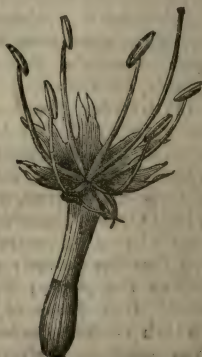
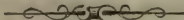


Fig. 100.—Same, with the perianth removed, to show the crown.



DESCRIPTIVE BRITISH BOTANY.

NOTE OF ABBREVIATIONS.—E. B. 224 is equivalent to the 224th plate of "English Botany," where that plant is represented. L. C. signifies the Catalogue of the Botanical Society of London, which Society, though at present in abeyance (some say *defunct*), will, it is hoped, be again resuscitated (to use a rather grandiloquent term), and become more useful than ever. The number following these letters means that the plant after which it (the number) stands is represented in the Society's herbarium under the same number. The herbarium still exists, and may be consulted by application to Mr. Brocas of the Linnæan Society. A. signifies the Area of the species or the number of the botanical provinces in which it occurs. The number of botanical provinces into which Great Britain is divided is 18, and the number 18 or 6 after the letter A. means that the said plant is found in all the provinces, or in 6 of them respectively, as the case may be. C. means County, and the number 60 intimates that the species occurs in 60 Counties of Great Britain. Alt. means Altitude, and it is marked in yards—0 being the mark for the coast-line. T. means Temperature, and 49°—41° indicates that the plant grows in a temperature between these two extremes, or has a range of 8°.

(82)

CLASS I.—ACOTYLEDONS, Juss.

Aerogens and **Thallogens**, Lind. **Cellulares**, D. C.
Cryptogamia (Cryptogamous plants), Linn.

The plants of this great and very heterogenous class are chiefly composed of cellular tissue; ducts and spirals are absent, except in the very highest orders. Their cuticle is without stomata (see p. 4), and their vegetative and reproductive organs are not very distinct. They increase either by a regular or irregular development in all directions (Thallogens, or Thallophytes, see Index), or by an extension of the axis of growth (Aerogens, see Index). The reproductive matter (sporules, or sporidia, or spores, see Index) is either dispersed in the substance of the plants (in the lowest orders), or enclosed in spore-cases (thecæ), and variously grouped or clustered in or upon the plants. Germination commences at any point on the surface of the spores or sporules.

SUB-CLASS I.—**AMPHIGENS**, Endl. **Thallogens**, Lind.
(See pp. 131, 132.)

The acotyledonous plants of this class have no vascular tissue, but are entirely composed of parenchymatous matter (cells). Sometimes

they consist of a congeries of cells, and sometimes of separate single cells. They have no distinct axis of growth, nor any distinction between root, stem, and foliage. Their fructification is very simple; the reproductive matter is either deposited in thecæ (spore-cases), or dispersed in the substance of the plant.

Note.—This, though the usual definition, requires some modification; for example, most Agarics, and several other genera of Fungi, have a real axis of growth and a symmetrical form. Several of the Algæ (Algæ), especially the marine species, have roots, stems, and foliage. Some fresh water Algæ have a stem and branches. Several Lichens have a sort of uniformity in their development.

ORDER I.—**ALGÆ.** THE SEA-WEED FAMILY. (See pp.131,132.)

This extensive order, or rather class, as Gray, in his excellent "Botanical Text Book," calls it, is almost entirely composed of aquatic plants, which either grow actually in water or in moist places on the earth. They are naturally divided into Marine Algæ, or sea-weeds,



Fig. 101.—*Chylocladia. Kaliformis.*
Corsican Moss. *Chondria.*



Fig. 102.—*a*, Branch magnified. *b*, A section of the sporule-case with the sporules.

properly so called because they grow only in the sea, and Terrestrial Algæ, or such as grow only in fresh water or in humid parts of the land. The highest or most developed forms are the sea-weeds, such as *Rhodomenia*, known as *dulse* in Scotland and *dillesk* in Ireland. *Laminaria*, *tangle*, *Porphyra*, *laver*, which is esteemed as a culinary delicacy.

The Fuci are, or were, employed in the manufacture of kelp.

Some of the sea-weeds have stems equal in length (though not in diameter) to the tallest of forest trees, and the gulf-weed is said to have a stem which is miles in length, and not thicker than a pack-thread. Some are so minute that they are individually invisible to the unaided eye; they are only visible when in a mass. Some are flat leafy expansions; some have stems or fronds, and some have both stems and foliage.

Others, as the green *Confervæ* of fresh water pools, are a congeries of simple cells which spontaneously separate, each cell becoming the parent of a new series. In their lowest forms the organs of vegetation and reproduction are undistinguishable, or rather identical. The colours of several kinds of sea-weeds are among the most beautiful and the richest presented by the whole vegetable kingdom. No plants exhibit a greater variety of admirable reds, greens, olive-greens, bright greens, browns of various shades, with black and white. The uses of the Algæ, in addition to that of furnishing a few esculents both for "man and beast," are considerable both in medicine and in the arts. Iodine, now extensively employed in medicine, is a product of kelp which is derived from sea-weeds. The arts are probably still more indebted to this extensive order. The oriental delicacy or edible birds' nests are constructed of the gelatinous substance of Algals produced in the seas of the East. These precious esculents are said to be sold for their weight in gold. The Chinese manufacture various kinds of glue or size from sea-weeds, and they sometimes construct their windows of the same materials.

Some of the Algæ (Algals) are common to both salt and fresh water. Many of the terrestrial species are among the simplest and the minutest of organic forms. The *Desmidiæ* are microscopic, single-celled, green organisms, consisting of cylindrical or angular filaments, which finally separate into segments. The *Diatomaceæ* differ from the last-mentioned group by their brown colour and in the silicious durable nature of their cell-walls. These are on the very limits of vegetation; and indeed until lately they were believed, from their mode of increase and their rapid movements, to belong rather to the animal than to the vegetable kingdom.

Some naturalists class them among animal, and others among vegetable beings; and some maintain that they are partly vegetable and partly animal, hence the term *Zoophyte* (animal plant).

"More worthless than a water-weed" (*vilhór algâ*), is an ancient classical proverb. Their value to the human race is probably not so great directly as indirectly. They supply both shelter and food to many aquatic animals; and hence their general utility in the economy of Divine Providence. The dulse and badderlocks, the tangles, the young stalks of some *Laminarias* are edible, and are to this day cried through the streets of many towns in Scotland, Ireland, Denmark, the Faroe Isles, and other northern countries.

The Irish Moss, *Chondrus* (*Sphærococcus*) *crispus*, and edible birds' nests of China, are the famous dietary species of this order. Laver, as before stated, is also of culinary repute.

In deference to Dr. Gray's opinion, Characeæ is placed next to Equisetaceæ. These plants agree with the Algæ in the simplicity of their vegetative system, but their fructification is of a higher order.

ORDER II.—**FUNGI**, Juss. THE MUSHROOM FAMILY. (See p.132.)

The plants of this family are generally parasitic, although to this rule there are many exceptions. They abound both on decaying and dead animal and vegetable substances, and rarely on living objects, except on decayed or decaying plants. In this they differ from Lichens, which often grow on living objects, as trees. They vary much in form, size, colour, and duration. Most of the conspicuous species of the order are distinguished by elegance of shape and bright glossy colours. Their common characteristic is simplicity of structure, being entirely cellular, though some of their cells are more or less elongated. Another almost equally common character is their brief duration. A very few only last two or three years. The greater

part perishes in a few days, and some in a few hours. This large order, or rather class, is sub-divided into several sub-orders; one of these contains the Uredines (Cornbrands). These attack the Cereals and other Gramineæ, and are very destructive.

The Mucedines, or Moulds, are extremely common, and are well known. The Puff-balls represent another large section of the conspicuous Fungi. The Geaster (star of the earth), the curious Phallus, the delicate Nidularias, the delicious Tuber (truffle) are representatives of the sub-order Gasteromycetes. The club-shaped Clavarias, the open-cup, or saucer-shaped, beautifully-coloured Pezizas, the Helvellas, the Morels, Jews'-ears, the Boletus, and above all the delicious Mushroom, belong to



Fig. 103.—*Agaricus phalloides*.—*a*, the valva; *b*, the stipe; *c*, the veil; *d*, the pileus; *e*, hymenium.

the last or highest sub-order of Fungi (Hymenomycetes.)

The geographical distribution of Fungi is but little known; only it is believed that they are more abundant in temperate than in tropical regions. The number of the British Fungi is at least double the number of the phænogamous plants spontaneously produced in these islands. The conspicuous species abound (especially in autumn) in woods, commons, pastures, and on old or decaying trees, on timber posts, rails, and in caverns or cellars. They seldom appear in cultivated ground (a few *Agarics* do occur about stacks, yards, and in rich

stubbles), or on rocks, or in the water—rarely in marshy places. In some countries, Russia and Poland for example, they form an important part of human diet, being very nutritious, eaten either pickled or fresh. Many are poisonous. Some are very destructive to the substances on which they grow, such as dry-rot (*Merulius*), blight, smut, rust, brand, etc. They are believed to be of immense importance in the economy of Nature, being, like beetles and other insect-scourges, the general scavengers of the earth. They absorb, or assimilate, or otherwise use up for their own growth, the putrescent noxious effluvia which are floating in the atmosphere wherever there is much organic matter in a state of decay or decomposition. Like some of the lower orders of the animal kingdom, they are objects of disgust or abhorrence to many. This, probably, is owing to their speedy decay, and sometimes to the fact that they form a *nidus* for many species of insects which, in the maggot-state, are disagreeable objects. Although so often regarded with prejudice, they are among the most interesting and curious of Nature's productions. Their growth is most rapid. The giant Puff-ball frequently attains a diameter of a foot in a single night. The common fetid Phallus in a few hours attains a height of upwards of six inches. They are celebrated as styptics, vulneraries, stimulants, condiments, and, as before observed, in many places as important dietetic substances. The Agaric (*A. phalloides*), of which there is a cut in the margin, is a virulent poison. Another nearly allied species (*A. muscarius*) is used by the natives of Kamtschatka to produce intoxication.

The celebrated Dr. Greville gives a circumstantial account of the disgusting practices of the Kamptschadales in their use of this plant. The ravages of dry-rot produced by a Fungus, *Merulius lachrymans*, etc., and the blasting consequences of rust, brand, mildew, mould, etc., are too well known. There may be danger in using as food wholesome species of Fungi, if such grow in places where they have in excess some of the usual constituents of their substance. As a general rule edible Funguses that grow in open places, as on pastures and grassy fields, are good, while the same species when they grow in woods may be unwholesome. Many species, excellent as culinary objects, and which are extensively eaten on the continent, are neglected in this country. Being mindful of the fatal consequences resulting from mistakes in this order, the use of all Fun-



Fig. 104.—*Boletus edulis*.

guses is to be avoided, except the common Mushroom, and then only when cultivated or gathered in open fields. All mycologists are aware that many species of Agarics, besides *A. campestris* (the common Mushroom) and the Champignon (*A. oreades*), the Chantarelle, the Morel, and the delicious Truffle are eatable, yet they do well to warn those who are not well acquainted with the order to abstain from anything like an indiscriminate use of these plants. It is probable that some naturally poisonous kinds are rendered innocuous by a sprinkling of salt, or by immersion in vinegar, which may absorb the acidity. (It may be supposed that they who preserve them throw away the pickle.)

As the larvæ of numerous insects are produced in the flesh of Fungi, this circumstance renders the Fungus disgusting if not deleterious.

The species of this order are more interesting by far to the genuine naturalist than to the *gourmand* or the *gourmet*, notwithstanding the delicious stews and sauces which are so universally admired by *bon-vivans*. The rapidity of their growth, the regularity of the forms of many species, the exquisite shades of colour they assume, their singular economy, their periods of duration, their sporadic growth, are all facts of great interest and suggestive of deep reflection.

There is another singular fact observed in some Fungi, viz., that if the flesh of a plant of this order be cleft or cut, and the parts or sections be applied together, the whole will coalesce, as the flesh of animals heals when wounded. Some have a delicious odour; many have a floury (farinaceous) smell; others have a very powerful scent. Not a few have an offensive, pungent, and intolerable stench.

ORDER III.—**LICHENES**, Juss. THE LICHEN FAMILY. (See p. 132.)



Fig. 105. — *Ceno-myce pyxidata*. — 1, thallus; 2, apothecia (thecae).

Perennial, terrestrial, universally distributed plants growing on the earth (few are aquatic), on rocks, trees, walls, palings, and roofs; rarely having an axis of growth, generally dilated in the form of a lobed, foliaceous, or hard crustaceous substance. They are composed of cellular tissue intermixed with some filamentous layers. The reproductive matter is in cups or shields (apothecia), either resting on the surface of the thallus (see Index), or immersed in its substance, or it exists in powdery spots scattered over the surface.

This order is intermediate between the Fungi, on the one side of the series, and Hepaticæ on the other. Lichens are the first plants that grow on rocks, and, by their decomposition, they produce mould in which plants of a higher development find nutriment. Many species of this family are of great value, especially in the arts. A large per-centage of amylaceous substance exists in several of them, viz., in *Cetraria Islandica* (Iceland Moss),

Irish Moss and others upon which their nutritious properties depend. Hence they supply dietary substances. *Cenomyce rangiferina* (Rein-



Fig. 106.—*Cetraria Islandica*.—1, Thallus or frond. 2, Thecae or apothecia.

deer Moss) grows on the very summits of our driest hills. It abounds in the deserts of Lapland, Sweden, Russia, and the north of Europe generally. It affords food to the reindeer, the Laplander's sole wealth. From *Roccella tinctoria*, a native of the Canaries, the beautiful archil, or purple dye of commerce, is obtained. This Lichen sometimes brings a fabulous price in the market—one thousand pounds per ton. Some of our native species yield valuable dyes, such as *Lecanora tartarea* (Cudbear), and many others. Their utility as colouring substances has recently been the subject of several valuable communications from the



Fig. 107.—*Roccella tinctoria*—Archil.



Fig. 108.—*Sticta pulmonacea*.

pen of Dr. Lindsay, of Perth,

who has successfully investigated the colorific properties of a large proportion of our native Lichens. These results have been published in various numbers of the "Phytologist," in 1856.

Most of the Lichens are crustaceous, or foliaceous, or membranous expansions, adhering at almost all parts of their under surface to the medium on which they grow. A few, as the *Cladonias* (Fairy-cups), Reindeer Lichen, Ramalina, and *Usnea*, have a kind of axis of growth. Their fructification is in cups or shields (apothecia), which rest on the surface of the thallus, or are more or less immersed in its substance. This order has been divided into four sub-divisions:—

1. Pulverulent Lichens with open shields (apothecia), and the cavity filled with free sporules.
2. Shields closed at first, opening afterwards, containing free spores.
3. Shields either always closed or opening through the cortical layer of the thallus.
4. Open, disk-like, permanent shields, bearing the sporules on the surface.

SUB-CLASS II.—**ACROGENS**, Lind. ACROGENOUS OR FLOWERLESS PLANTS.

Substance of the plant chiefly composed of cellular tissue (in the higher orders only spirals and ducts are present). They have usually a distinct axis of growth and increase by additions to their apex (hence their name Acrogens), and they have usually distinct foliage. Reproduction takes place by spores or sporules, contained in cases or imbedded in the substance of the frond. Germination occurs upon any part of the surface of the spores or sporules.

ORDER IV.—**HEPATICÆ**, Juss. THE LIVERWORT FAMILY.

The plants of this order are chiefly of a loose cellular texture, usually prostrate, and producing rootlets on their under sides. They grow on the ground or on trees in damp places, with somewhat of a leaf-like development, and a kind of axis of growth. Sometimes the stem and leaves unite and form a confluent expansion; sometimes the leaves are distinct from the stem. Their reproductive organs (antheridia and pistillidia) are variously situated, generally rising from the frond, and situated on a peduncle (stalk), opening at the extremity with 2—4 or many valves. These plants are usually very minute, and are found in all climates from Melville Island to the extreme South.

"The most remarkable point of structure in *Hepaticæ*," Dr. Lindley states, "is the spiral filament, as it is called, lying among the sporules within the theca (sporule-case). This consists of a single fibre or two, twisted spirally in different directions so as to cross each other, and containing within a very delicate, transparent, perishable tube. They have a strong elastic force," etc.

This order is the connecting link between the least developed and the highest developed orders of acotyledonous plants; or the plants of this order are intermediate between Lichens on the one side, and

Mosses on the other. Many of them have a distinct axis of growth, and most of them assume more or less the usual colour of the subjects of the vegetable kingdom. Scarcely anything is known of their properties. This order is sub-divided into— *the suborders*

1. **Marchantiaceæ**, Lind. True Liverworts. Perennial leaf-like plants, growing on the ground or on walls, rocks, and damp places, often covering considerable surfaces. The fructification is elevated on a stalk, and is either capitate or radiate, bearing spore-cases on the under side, which open variously, but are not four-valved.

2. **Ricciaceæ** are chiefly floating plants, rooting like *Marchantia* from beneath, with their fructification immersed in the frond. The spore-case bursts irregularly.

3. **Anthocerotæ**. Annuals. Fleshy or membranous fronds, spore-case elevated on a pedicel about two or three inches long, one or two-valved; with a free central columella.

4. **Jungermanniaceæ**. Frondose or foliaceous plants; the spore-case opens with four valves, and the spores are mixed with elaters, which are also present in the *Marchantias*, but not in the other two suborders. This family unites the Mosses with the less developed orders of the vegetable kingdom.

ORDER V.—MUSCI. THE MOSS FAMILY.

Low, tufted, erect or prostrate plants, mostly terrestrial, but some are aquatic, with distinct, sessile, minute, entire, or serrated leaves. Reproductive organs of two kinds:—1. What are called *antheridia*, numerous (4—20) minute cylindrical or fusiform axillary sacs, containing multitudes of ovate particles in a mucous fluid. 2. *Thecæ*, cylindrical or ovate or round bodies produced at the apex of a *seta* (bristle or stalk), covered with a veil (calyptra), closed by a lid, within which there are one or several rows of rigid processes called (collectively) the *peristome*. The centre of the theca is occupied by an axis or columella, and the space between it and the sides contains the sporules. The sporules germinate by the protrusion of filaments, which afterwards ramify and form an axis of growth at the point of their ramification (Dr. Lindley). Their vegetative organs have a remarkable similarity to the same organs in the order *Lycopodiaceæ*. The spore-case usually opens by a lid (operculum), and before



Fig. 109.—1, *Marchantia polymorpha*; 5, Sporule magnified.

expansion the calyptra, or veil, entirely covers the capsule (spore-case). The thread-like stalk (setum) which supports the capsule (fructification) is continued through the capsule and forms the columella, the perpendicular axis as described above. If the calyptra splits on one side, it is termed *cuculliform* (hood-shaped); if not, it is *mitriform* (mitre-shaped).

Concerning this order, Sir W. J. Hooker says, "Among all the plants of the class *Cryptogamia* (Acotyledons), no order, perhaps, presents a more varied and exquisitely beautiful structure than the Mosses; whether we consider their foliage, their capsules, or the delicate single or double fringe which surrounds the mouth of the latter. They are mostly in perfection in the winter months, and no part of the globe appears to be entirely destitute of them." Mosses are found in all quarters of the world; but they are more common in temperate and cool climates than in the warmer regions of the earth. They delight in the moist shady recesses of rocks, and abound on the umbrageous banks of mountainous streams. In the economy of nature they subserve important purposes; their direct utility to man is perhaps but little. As ornamental objects they are just beginning to attract some attention.

ORDER VI.—**LYCOPODIACEÆ**, Juss. THE CLUB-MOSS FAMILY. (See p. 132.)

Perennial plants, with creeping or prostrate, or erect, leafy, and mostly branching stems. Leaves minute, lanceolate or subulate, one-nerved, imbricate. Thecæ (spore-cases) sessile in the axils of the leaves. These sometimes form a kind of ament or spike. They either open by distinct valves, or are indehiscent (not opening), and contain minute grains like fine powder, or a few rather large sporules.

SYNOPSIS OF THE GENERA.

Lycopodium, Linn. Leaves minute, imbricate. Spore-case two-valved, containing a powdery substance, or three-valved, containing one-four granules (large sporules).

Isoetes, Linn. Leaves grass-like, inflated at the base. Spore-cases not opening; sporules of both kinds, both powdery and granular.

I. *Lycopodium*, Linn. Terrestrial creeping, prostrate, or erect plants, with herbaceous or almost ligneous stems. Leaves very numerous, often spirally arranged around the stem. Fructification in terminal spikes or in the axils of the bracteal leaves.

SECT. I.—Fructification one-celled (of one kind), with very minute sporules.

1. ***L. clavatum***, Linn. Common Club-moss. E. B. 224, L. C. 1412.

Fronds prostrate, rooting, much branched, slender (about as thick as common packthread), ~~two-three feet long~~ (indefinite in length, the stems root at intervals, and then throw out successions of fresh runners). Leaves linear-lanceolate, ending in an awn, arranged in several ranks

(rows), and entirely covering both the stem and branches; they have a single faint nerve. Spore-cases (fructification) all of one sort, arranged in cylindrical spikes, which stand in pairs or in threes on the summits of the branches *on long slender wiry peduncles*. Bracts ovate-acuminate, awned, slightly toothed, about three times as long as the spore cases. On heaths and mountainous places. Perennial. July—September.

A. 18, C. 60. Lat. 50°—60°. Alt. 50—650 yards. T. 49°—41°.

Note.—There is an interesting account of this *Lycopod* in Gerarde's "Herbal," by Johnson, p. 1562, and in the "Phytologist," vol. i., p. 1.

2. **L. annotinum**, Linn. Interrupted Club-moss. E. B. 1727, L. C. 1413.

Stem (frond) reclining at the base, and creeping, with long erect branches which are densely leafy, each branch terminating in a short erect *sessile* spike. Leaves elliptical-lanceolate, *pointed, serrated with sharp tapering teeth*, imbricate or spreading. Spikes cylindrical, greenish yellow, closely imbricated with membranous ovate-acuminate scales from half an inch to an inch long. Smith, in E. F. iv., p. 321, says, "Spikes rather tawny, an inch, or, when at maturity, an inch and a half long; their scales shortened and much dilated, assuming an ovate, or sometimes a kidney-like shape, though always pointed." Babington, in "Man. Br. Bot." 2nd ed., says, "Spikes cylindrical, greenish yellow, not persistent, as supposed by Smith." The latter is, however, *guiltless of said supposition*. Mountains of Wales. North of England and Scotland rare. Perennial. June—August.

A. 7, C. 12. Lat. 53°—60°. Alt. 50—900 yards. T. 46°—37°.

3. **L. alpinum**, Linn. Alpine Club-moss. E. B. 234, L. C. 1415.

Stems (fronds) round, stout, woody, prostrate, with a few scattered leaves or scales, spreading to a considerable extent, with numerous *erect clustered branches*. Leaves lanceolate, acute, *entire*, imbricated in *four rows*. Spikes of fructification cylindrical, slender, on rather long, twice-forked, slender peduncles (there are usually four-six spikes together, each on its distinct stalk, the branch being once or twice forked; the fertile branches are always accompanied with numerous barren branches). On mountains in England, Wales, and Scotland not uncommon. Perennial. August, September.

A. 14, C. 40. Lat. 51°—61°. Alt. 0—1200 yards. T. 47°—34°.

4. **L. selago**, Linn. Fir Club-moss. E. B. 233, L. C. 1416.

Roots fibrous, stems (fronds) erect, forked, level-topped, four-nine inches high, densely leafy. Leaves *lanceolate, keeled, entire*, densely imbricate, slightly spreading. Fructification *not in spikes, but on the uppermost parts of the branches*. The fructification is well illustrated by Mr. Newman in his "History of the British Lycopods," "Phytologist," vol. i., p. 84. On heaths and mountainous tracts in many parts of Britain. Perennial. June—August.

A. 18, C. 70. Lat. 50°—61°. Alt. 0—1440 yards. T. 48°—32°.

5. **L. inundatum**, Linn. Marsh ~~do~~. E. B. 239, L. C. 1414.

Barren stems, prostrate, rooting *very short* (three-four inches long, the leaves on the under side, or some of them at least, are converted

into rootlets). Flowering stems erect, bearing a single spike. Leaves linear, acute, spreading, erect, subulate. The leaves of the spike are similar to those of the stem, only enlarged at the base, by which they closely embrace the spike. Spikes solitary on erect leafy branches, cylindrical, about half as long as the upright stalk. Spore-cases in the axils of the scales (leaves), solitary, uniform, *circular*. On moist heaths, etc., not infrequent. Perennial. June—September.

A. 12, C. 40. Lat. 50° — 58° . Alt. 0—200 yards. T. 51° — 46° .

SECT. II.—Fructification of two kinds: upper, minute, powder-like; lower, larger, granular.

6. *L. selaginoides*, Linn. Prickly ~~grass~~ ^{club-moss}. E. B. 1148, L. C. 1417.

Roots fibrous, small. Stems (fronds) several, slender, leafy, branched, partly reclining, ending in erect, leafy, solitary spikes. Leaves somewhat membranous, dilated at the base, ovate-acuminate, *serrated with sharp spreading teeth*. Leaves of the spike larger than those of the stems. Fructification axillary, solitary, two-valved. Spore-cases full of chaffy (seeds, Smith) spores, and others which are three-valved spore-cases, each containing two-four large globular grains. In watery, heathy, mountainous places. Perennial. August.

A. 12, C. 40. Lat. 53° — 61° . Alt. 0—1100 yards. T. 48° — 36° .

Sub-Order **Isoetæ**. (See p. 132.)

II. **Isoetes**, Linn. Aquatic plants, with perennial roots. Fronds all radical. Fructification within the swollen bases of the fronds (leaves) one-celled. Sporules of two kinds, attached to *filiform* receptacles.—Babington. (Membranous, sessile, *ovate*, somewhat compressed.—Smith.)

I. lacustris, Linn. Quillwort. Merlin's Grass. E. B. 1084, L. C. 1418.

Roots tuberous and fibrous. Stem none. Fronds numerous, awl-shaped, erect, smooth, quadrangular, three-nine inches long, composed of four longitudinal cells with transverse partitions, dilated at their base, and bearing the ovate, compressed fructification. Alpine lakes. First noticed in Britain by Mr. Lhwyd.

A. 8, C. 20. Lat. 52° — 59° . Alt. 0—600 yards. T. 47° — 41° .

Var. *β. procera*. Taller, slender and brittle. First noticed by Dr. Richardson.

ORDER VII.—**MARSILEACEÆ**, Brown. THE PILLWORT FAMILY. (See p. 133.)

Perennial, herbaceous, aquatic (sometimes palustral) plants, with a filiform, creeping, branching rhizome. Leaves in pairs, circinate before expansion, linear-subulate. Fructification globular, either four-celled or two-celled by transverse partitions, and two-four valved, on short pedicels or sessile on the rhizome, and contiguous to the leaves. The spores, which are enclosed in the globular fructification, are of two kinds, viz., a large spore (the part which germinates), and numerous minute granules in a gelatinous fluid.

Pilularia. Leaves linear-subulate. Fructification capsular and globular; fertile spores large, situated at the lower part of the cells, the barren and smaller spores on the upper part.

P. globulifera, Linn. Pillwort or Peppergrass. E. B. 521. Compare Mr. Newman's account in "Phytologist," vol. i., pp. 209—211, L. C. 1419. Rhizome variable in length, filiform, branching, throwing out roots on the under side and leaves on the upper at regular intervals. Leaves linear-subulate, often tufted. Fructification about as large as small peas, densely covered with brownish hairs. Watery places, as the margins of ponds and lakes; sometimes on the verge of ditches by roadsides. Perennial. July—September.

A. 17, C. 50. Lat. 50°—59°. Alt. 0—300 yards. T. 52°—45°.

Var. *β. natans*. Merat. Fl. Par., 2nd ed., vol. i., p. 283. Whole plant floating with very elongated leaves. There is a history of a submersed state of this plant by the Rev. W. W. Spicer. The variety is stated to have occurred at Henley Park, in Surrey, and to have been there upwards of a hundred years. See "Phytologist," vol. iv., pp. 349, 350.

ORDER VIII.—**CHARACEÆ.** THE CHARA FAMILY. (See p. 131.)

Aquatic submersed annual or perennial plants. Stems cylindrical, leafless, jointed and branching; each joint composed of a single cylindrical cell, or of one cell surrounded with a series of smaller spirally-disposed cells; branchlets (secondary branches) in whorls at the junctions, bearing the fructification when simple. When compound, the fructification is seated in the axils of the uppermost whorls of the secondary branches. Fructification of two kinds, sporangia and antheridia, or the nucleules and the globules, either produced by the same plant, and in this case contiguous, or on distinct plants. Sporangia ovate or roundish, crowned by five more or less prominent teeth, which terminate an equal number of spiral fibres which envelope the spore. The spore contains a multitude of minute striated granules. Antheridia globular, slimy, reddish, splitting.



SYNOPSIS OF THE GENERA.

Chara. Stem with a central tube surrounded by a row of smaller tubes spirally disposed around the single primary tube.

Nitella. Stem composed of a series of simple tubes.

Fig. 110.—*Nitella syncarpa*, var. *capitata*. 1, Upper part of the stem, nat. size; 2, Transverse section of stem magnified; 3, Cluster of globules (antheridia) magnified; 4, A branchlet of the cluster, with globule, greatly magnified; 5, Upper part of the stem of fertile plant magnified, and bearing three sporangia (nucules).

Chara, Linn. in part. Stems *opaque*, very brittle after being dried; joints composed of a *central tube surrounded by a series of similar smaller tubes spirally disposed*. Sporangia and antheridia produced on the same plant, rarely on separate plants. Sporangia solitary, surrounded by unequal bracts, crowned with more or less prominent teeth, situated above the antheridia, in the monœcious plants.

1. **C. vulgaris**, Smith. *C. fetida*, A. Braun. Common Chara. E. B. 336.* Plant monœcious. Stems four-twelve inches, opaque, more or less slender, striated. Branchlets six-ten in a whorl, simple, bearing on their interior side usually four bracts. Sporangia solitary, ovate, more or less *surpassed by the bracts*. Antheridia solitary, below the involucre (bracts). In muddy stagnant ditches, common. May—August.

Var. *β. hispidula*. Stem provided with very slender pointed tubercles and very short bracts.

Var. *γ. papillaris*. Stem armed with long and very caducous tubercles.

Var. *δ. longibracteata*. Bracts very long.

Var. *ε. densa*. Branches short and thick, with contiguous verticils (whorls). In ditches and ponds where there is but little water. This is a very common form.

Note.—The smell of this species in all its forms is very fetid (offensive).

2. **C. hispida**, Linn. Prickly Chara. E. B. 463. Plant monœcious. Stems nine-twentyfour inches long, opaque, *robust*, with *spiral furrows, bearing long papillæ* (long-pointed tubercles) *in tufts on their upper parts*. Branchlets in whorls of six-ten, simple, bearing on their interior side the involucre (four or more bracts). Sporangia solitary, ovate, with twelve-fifteen striæ (stripes), surpassed by the bracts. Antheridia solitary, underneath the involucre. In claypits, pools, and similar places. June—August.

Var. *β. pseudo-crinata*. Papilles more abundant than in the type, and completely investing the upper part of the stem.

3. **C. tomentosa**, Linn. Downy Chara. Hooker's Icones, 532. (See "Manual of British Botany," *in loco*.) Plant *diœcious*. Stem sulcate, with twice as many surrounding tubes as there are branchlets in a whorl, and *with scattered papillæ* (tubercles), *greenish-white, opaque*. Branchlets incurved; bracts ovate-oblong, mucronate; nucule shorter than the bract. Belvidere Lake, Westmeath, Ireland. Annual. July.

4. **C. aspera**, Willd. Bristly Chara. E. B. 2738. Plant *diœcious*. Stem striated, flexible, *with hair-like spreading spines*, coated or surrounded with three times as many tubes as there are branchlets (six-eight) in a whorl. Branchlets whorled, slender. Six-eight nucules, ovate or narrowly oblong, with twelve striæ shorter than the bracts. Globules solitary, surrounded by the unequal bracts. Stagnant water. May—August.

* The plants of this order are *not* in the "London Catalogue of British Plants," and consequently do not appear in the "Cybele Britannica," from which work, with the learned author's kind permission, the range, both horizontal and vertical, and the census of the plants, and the temperature at which they grow, are taken.

5. **C. fragilis**, (Desvaux.) (C. Hedwegii). Brittle Chara. E. B. S. 2762. Plant *monœcious*. Stems slender, *smooth*, green, with three times as many external tubes as there are branchlets in a whorl. Branchlets simple, six-ten in a whorl, bearing on their inner side usually four bracts. Nucules (sporangia) ovate, with twelve striae *longer than the bracts*. Globules solitary below the nucules. Stagnant water. Annual. June—August.

6. **C. crinita**, Wallr. Hairy Chara. Plant *diœcious*. Stems slender, striated, *beset with setaceous, spreading, clustered spines*. Branchlets short. Nucules narrow, oblong. In stagnant, brackish pools. Cornwall. Annual. August. See Babington's "Manual," *sub Chara*.

Nitella, Agardh. Stems more or less diaphanous, often translucent, *flexible after dessication* (drying); joints composed of *one single tube*. Sporangia (nucules) and antheridia (globules) either produced on the same plant or on separate plants. Teeth of the sporangia scarcely prominent or indistinct. Antheridia situated as in the genus *Chara*.

SECT. I.—Sporangia and antheridia (nucules and globules) growing on the inner side of the branchlets, subtended by an involucre of two-four long bracts; branchlets simple.

1. **N. glomerata**, Desv. *Chara nidifica*. Fl. Dan. (C. Smithii, Bab.) Clustered Chara. E. B. 1703. Plant *monœcious*. Stems three-twelve inches long, rigid, green, or greenish, rarely invested with a coating of cretaceous mud. Branchlets in whorls of six-fourteen, consisting of many joints, the lower joints *producing three-six elongate almost equal bracts*, also composed of many joints, and producing at their lower joints other series (whorls) of secondary bracts, whorls of the first order (primary) lax, usually with barren bracts. Fruit-bearing whorls contiguous, terminating the axillary branches and the stems. Sporangia (nucules) roundish, with three-six striae, nearly sessile, or sessile grouped in clusters of two-eight on the summit of the lower joints of the branchlets or of the bracts. Antheridia (globules) in the centre of the clusters of nucules, or more frequently at the base of the branchlets, or at the apex of the rudimentary branchlets, and then situated in the centre of the converging fruit-bearing branchlets. In lakes and stagnant water. Annual. June—August.

For a characteristic cut of this plant, see "Atlas de Flore des Environs de Paris," Plate XLI., Fig. H.

From the above work the following description of another Chara is compiled, although we do not know that it grows in the British islands, but if it has not yet been noticed, it may be, and its description may help to its recognition:—

2. **N. stelligera**. Illustr. Fl. Par. *C. translucens*. Rchb. ic. cent. viii. f. 1087. Plant *diœcious*. Stems six-eighteen inches high, rigid, greyish, invested with a thin coating of calcareous matter. Branchlets simple, four-eight in a whorl, obtuse, of two-three joints, the

lower ones (joints) producing on their upper portion two unequal, elongate bracts, consisting of only one joint; the lower verticils (whorls) are abortive, and combine to form a crustaceous whitish mass, with four-eight blunt radiate lobes; hence the name *stelligera* (star-bearing). Nucules ovate, solitary, in the forks of the bracts. In rivers, canals, and gently flowing water, in the vicinity of Paris. Annual. July—September.

SECT. II.—Branchlets twice or thrice-forked, rarely simple. Sporangia and antheridia (nucules and globules) either axillary at the angles of the branchlets or lateral (on the sides) and without bracts; sometimes terminal, and then subtended by bracts.

3. **N. syncarpa.** Illustrations Fl. Par. Var. *β. Smithii*. *C. flexilis*, Sm. Smooth Chara. E. B. 1070. Plant *diœcious*. Stems six-twelve inches long, slender, very flexible, green, shining, and transparent. Branches six-ten in a whorl, usually *short* two-three *forked*, whorls either lax or dense. Antheridia solitary, either in the forks or at the extremities, dull red, with numerous minute cracks. (Sm.) Sporangia either contiguous to the antheridia or on a separate plant. In rivers and ponds. June—August.

Var. *α. capitata*. Primary branchlets (of the first order) very long, often simple (not forked). Antheridia (globules) mostly in dense clusters, produced on very short branchlets, each terminating in a globule; the whole being borne on axillary branches.

Is this form found in Britain?

Var. *β. Smithii*. *Chara flexilis*, Sm. E. B. 1070. (See above.) Branchlets of the first rank, short, usually two-three-forked. Globules not in dense groups (clusters), but produced at the base of the uppermost or secondary forks of the branchlets.

4. **N. translucens.** Illustrations Fl. Par. *C. translucens*, Sm. Transparent Chara. E. B. 1855. Plant *monœcious*. Stems twelve-thirty inches long, *rigid*, green, shining, transparent, sometimes with annular cretaceous incrustations. Sterile branches in lax whorls; fertile branches very small, each bearing at its apex three small bracts, with the antheridia in their centre. Sporangia roundish, with five-seven striæ. In pools, rare. June—August.

5. **N. mucronata.** Illustrations Fl. Par. Pointed Chara. Plant *monœcious*. Stems six-twelve inches high, slender, green, flexible, transparent. Branchlets in more or less lax whorls, three-four-forked; secondary branchlets one-three-forked, erect; the ultimate divisions *two-jointed* and *shorter than the lower*. Globules solitary on the uppermost forks. Nucules roundish, striated, solitary under the globules. In stagnant waters, and in rivers with a slow current. Annual. June—August.

6. **N. gracilis**, Agardh. *C. gracilis*, Sm. Slender Chara. E. B. 2140. Plant *monœcious*. Stems very slender, three-nine inches high, *bright green, very flexible*, transparent. Branchlets in lax whorls, three-four-forked, very slender and divergent; terminal divisions of two joints, mucronate and slenderer than the other joints. Antheridia

(globules) solitary, in the angles with the sporangia. Sporangia ovate-rounded, terminating in a blunt point, situated below the globule. Stagnant water where the bottom is sandy. Annual. June—August.

7. **N. prolifera**, A. Braun. Proliferous Chara. Plants monœcious. Stems slender, equal, flexible, transparent. Branchlets (secondary branches) simple or with three-four joints. Globules (antheridia) sessile; nucules (sporangia) solitary or several subtended by three short bracts (bracts shorter than the nucules?). Ditches in Norfolk and Essex. Annual. April.

8. **N. Borreri**, Bab. Borrer's Chara. E. B. S. 2762. Plant monœcious. Stems as in the two species above described. Branchlets mucronate. Globules (antheridia) stalked or sessile; nucules (sporangia) several, subtended by three short bracts. This is said to be similar to *N. glomerata* and *N. prolifera*, but larger. Ditches in the south of England. Annual. June.

9. **N. polysperma**, A. Braun. Many-seeded Chara. Plant monœcious. Stems as in the preceding two species above described. Branchlets of the primary whorls once or twice unequally branched. Nucules and globules placed at the junctions of the branchlets between the lateral rays. Ditches and ponds in Suffolk. Annual. April.

Note.—Mr. Babington's "Manual," 4th ed., has been followed in the description of these three alleged species, *N. prolifera*, *N. Borreri*, and *N. polysperma*.

10. **N. tenuissima**. *Chara tenuissima*, Desv. Very slender Chara. Plant monœcious, dull green. Stems usually several feet long, capillary, very flexible, transparent. Branchlets short, in very dense globular whorls, terminal divisions mucronate, longer than the others. Globules at the angles of the branchlets. Nucules roundish with six-eight striæ, with a blunt point, solitary under the globules. In masses (tufts) at the bottoms of muddy ditches. Annual. June—August.

ORDER IX.—EQUISETACEÆ, Rich. THE HORSETAIL FAMILY. (See p. 133.)

Terrestrial or aquatic perennial plants, often with creeping branching roots (rhizomes). Stems cylindrical, jointed, furrowed or ridged, simple, with or without whorled branches; every joint is provided with a membranous, toothed sheath; branches furnished with similar fewer-toothed sheaths at their joints. The epidermis is furnished with stomata (see p. 4, Fig. 9), arranged regularly. Spore-cases all of one kind, membranous, opening by a longitudinal slit, arranged circularly on the lower (under) side of pedicelled scales, forming a cone or spike at the apex of the stems or of the branches. Spores numerous, free, each with four filiform appendages, which either envelope the spores or extend in a radiate manner (see Fig.)

Equisetum, Linn. Horsetail. Character same as that of order.

SECT. I.—Barren and fertile fronds distinct and unlike.

1. **E. arvense**, Linn. Field Horsetail. E. B. S. 2020, L. C. 1422. Fertile stems (fronds) three-six inches high, quite simple (without

whorled branches), reddish brown, with *very lax* ovate sheaths, which are *deeply divided into eight-twelve lanceolate-acuminate teeth* (see Fig.) Spike oblong, cylindrical, not apiculate. Barren fronds (stems) nine-eighteen inches high, deeply furrowed, naked at the base, and throwing out up-

wards a great many whorled branches; sheaths smaller than in the fertile fronds. Branches usually simple, quadrangular, grooved, rather rough. On wet fields, banks of rivers, and similar places. Perennial. The fertile frond appears in April and May; the barren fronds subsequently.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—43°.

Note.—Both fertile and barren fronds grow from the same creeping root, but from different parts of the root.

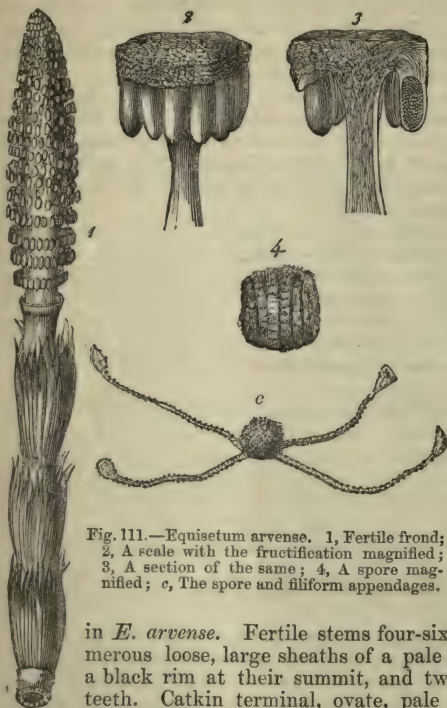
2. ***E. umbrosum***, Willd. Shady Equisetum. E. B. S. 2777, L. C. 1421. Root as

Fig. 111.—*Equisetum arvense*. 1, Fertile frond; 2, A scale with the fructification magnified; 3, A section of the same; 4, A spore magnified; c, The spore and filiform appendages.

in *E. arvense*. Fertile stems four-six inches high, with numerous loose, large sheaths of a pale yellowish colour, with a black rim at their summit, and twelve-twenty lanceolate teeth. Catkin terminal, ovate, pale brown. Barren stem *very scabrous, with prominent, closely set points*, and with ten-fifteen branches in a whorl; sheaths lax, with many lanceolate or setaceous teeth, lower part of the stem naked (without branches); in general outline the *frond is obtuse at the summit*. In this species the branched frond sometimes (frequently?) produces catkins. This occurs, though rarely, in *E. arvense*. Banks of the Isla and Esk, Forfarshire. Perennial. April.

A. 8, C. 20. Lat. 53°—58°. Alt. 0—200 yards. T. 47°—45°.

3. ***E. Telmateia***, Ehrh. Great Horsetail. E. B. S. 2022, L. C. 1420. Fertile stem six-nine inches high, with numerous very lax sheaths, which are *deeply divided into twenty-thirty acuminate-subulate teeth*. Spike oblong, cylindrical, not apiculate. *Note.*—The fertile



stems (fronds) appear in this species and in the foregoing before the barren fronds. Barren fronds of a whitish colour, slightly grooved (furrowed), nearly as stout as the fertile fronds, with numerous whorled branches; sheaths shorter and not so lax as in the fertile stem, with shorter, narrower teeth; branches slender, rigid, elongate, with eight angles, usually quite simple. In shaded, rich, moist soil this sometimes attains a height of from two to three yards. Its usual height is from two-three feet. In marshy shady places. Perennial. April. The barren stem is developed about midsummer.

A. 16, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

4. *E. sylvaticum*, Linn. Wood Horsetail. E. B. 1874, L. C. 1423. Fertile fronds erect, six-nine inches high, brownish, with lax sheaths, which are divided at their apex into *three-five ovate-lanceolate teeth*. Catkin cylindrical, blunt. *Note*.—The fertile stem has usually a few (two-three) whorls of abortive branches next to the catkin, but the stem is much thicker and much shorter than the barren stem. Barren stem slenderer than the fertile one, more deeply furrowed, and twice or thrice as long; the sheaths are not so lax, and the teeth are narrower; *branches compound, usually deflexed*. This latter character will distinguish this elegant species from every other British *Equisetum*. In shady, wet places. Not uncommon about Hampstead Heath, near London, and in woods adjoining thereto. Perennial. May—August.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—900 yard. T. 51°—37°.

SECT. II.—Fronds all similar and fertile.

5. *E. limosum*, Linn. Smooth Naked Horsetail. E. B. 929, L. C. 1425. Stems all similar, and all fertile, *with shallow furrows (not so deeply furrowed as some of the species)*, erect, stout, *without branches*, or having a few branches on its upper part; sheaths cylindrical, close, with numerous short, rigid, linear-subulate, usually black, teeth. Catkin large, cylindrical-ovate. This is rather an aquatic than a palustral plant, usually growing in stagnant water. Perennial. June—July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—700 yards. T. 52°—39°.

Mr. Baker, in the "Phytologist," vol. iv., p. 1056-1060 and 1117-8 (with sections of the stems of the two supposed species or forms) has described a variety, which he calls *β. fluviatile*, Fries, as having a more deeply furrowed stem, with short, dark brown, sharp teeth.

Note.—"The *E. fluviatile* of English botanists, until quite recently, intended (signified) *E. Telmateia*. Now the name *E. fluviatile* may be said to mean the branched state of *E. limosum*; scarcely a variety, because passing so very gradually one into the other."—Mr. H. C. Watson, in "Cybele Britannica," vol. iii., p. 307.

Var. Stem quite simple, smooth, deeply furrowed (without tubercles). Sheaths rather lax, with lanceolate teeth; each tooth has a scarious margin. In the great Merstham pond, Surrey. Mr. J. D. Salmon.

6. *E. palustre*, Linn. Marsh Horsetail. E. B. 2021. L. C. 1424.

Stems erect, *branched, slender, smooth*, or only slightly rough, with eight-twelve deep furrows, and lax, green sheaths, which are furnished with eight-twelve lanceolate pointed or acuminate, brownish teeth. Branches in whorls, eight-twelve, or fewer by abortion, slender, quadrangular, elongate. Catkins cylindrical, slender, not apiculate.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—850 yards. T. 52°—38°.

Note.—All the stems are fertile. Marshy places; common. Perennial. June—August.

Var. *β. polystachion*, Ray. Catkins numerous, borne usually on the upper whorls. Sometimes all the branches bear catkins.

Var. *γ. nudum*, D. C. Stem nearly or quite simple.

7. **E. Mackaili**, Newman. *E. trachyodon*. Certainly the plant of A. Braun. C. C. Babington, "Manual of British Botany." L. C. 1427. Root black, fibrous. Stems erect, deeply furrowed with eight-twelve furrows, sometimes branched; in this case the branches are quite erect. Sheaths *entirely black*. Teeth more persistent than in the following, not quite black, but with a shade of green, long and slender. Catkin (fructification) ovate, small, nearly black, with a very short apiculus. Ireland. Perennial. July—August.

A. 1, C. 2. Lat. 57°—58°. Alt. 0—100 yards.(?) T. 47°—46°.

8. **E. Moorei**, Newm. Stems longer, slenderer, and with fewer furrows, and they die down annually. (*E. Mackaili* and *E. hyemale* have persistent stems, or do not decay in winter.) Ireland. (See "Phytologist," vol. v., pp. 17—20.)

9. **E. hyemale**, Linn. Dutch Rushes. Greater Rough Horsetail. E. B. 915. L. C. 1426. Stems erect, stout, of a light glaucous green, having fifteen-twenty furrows, persistent after the fructification vanishes; rarely with a few erect branches. Sheaths cylindrical, close, black at the base and apex, the central part being of the same colour as the stem. Teeth fifteen-twenty, subulate *caducous*. Spike ovate, oblong, short, apiculate. In moist woods, turbaries, and marshy places. Perennial. July—August.

A. 14, C. 30. Lat. 51°—58°. Alt. 0—200 yards. T. 49°—46°.

These three species or forms have a striking resemblance. *E. Moorei* appears to connect *E. hyemale* with *E. Mackaili*, or *E. trachyodon*, or whatever other name botanists may please to call it. The latter has a slenderer stem than *E. hyemale*, and has also fewer furrows. The black sheaths, on which much stress is laid, sometimes are found on *E. hyemale*, especially towards the base; and the upper sheaths in *E. Mackaili* are not black, but green. Compare Mr. Newman's description and figure in "Phytologist," vol. i., pp. 305-8.

10. **E. variegatum**, Weber and Mohr. Variegated Shave-grass or Horsetail. E. B. 1987, L. C. 1428. Roots as in the above described species or forms. Stems simple, or but slightly branched, slender, about a foot high, very rough, *with four-ten furrows*, lower part of the sheaths green, like the stem, the upper portion black, with short, triangular, or lanceolate teeth. Catkin small, terminal,

apiculate, and striated with few scales. Lancashire and Cheshire, on the Mersey, and similar sandy places. Perennial. July—August.

β. arenarium. Stems prostrate; teeth of the sheaths wedge-shaped.

γ. Wilsoni, Newman. Stem erect, tall (three feet) sheaths, with a black ring at their summit; teeth short, blunt. See "Manual of Br. Botany," 2nd ed. Also Newman in "Phytologist," vol. i., p. 337. In the same vol. at p. 273, under *E. hyemale*, the latter learned author describes both *E. Mackaii* and *E. variegatum* as varieties of *E. hyemale*. In vol. v., p. 19, etc., he appears to have changed his mind, for in the last quoted place *E. Moorei* is described as a species, and Mr. Newman's name is appended as sponsor to the same. Mr. Babington, in his 4th edition of the "Manual," affirms that this species is *E. trachyodon*. See *supra sub voce*, *E. Mackaii*.

Compare Mr. Newman's "History of the British Equiseta," "Phytologist," vol. i., pp. 273, 305, 337, 529, vol. ii., p. 25, etc.

ORDER X.—**FILICES**, Juss. THE FERN FAMILY. (See p. 133.)

Perennial plants, with a short or creeping rhizome. Fronds

(leaves) scattered on the rhizome or growing from its summit. Circinate (coiled like a spiral) before expansion, very rarely not circinate, as in

Ophioglossaceæ, pinnatifid or pinnate, rarely simple; epidermis provided with stomata. Rach (*rachis*, see Index) furnished with hairs or scales (dilated hairs). Spore-cases pedicelled or sessile, opening regularly or irregularly, either with or without an elastic jointed ring, usually on the under side of the frond or towards the margin of the lobes or pinnæ, disposed in groups, either bare or covered with an indusium (see Index), sometimes in spikes or in panicles. Spores numerous in each spore-case, globular or angular.

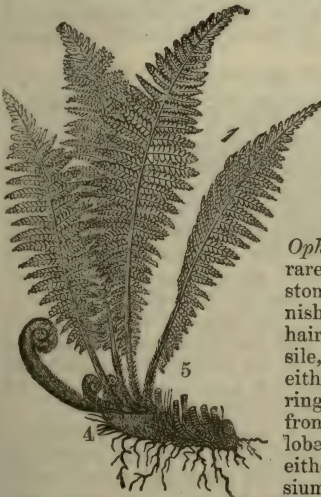


Fig. 112. — *Lastrea Filix-mas*, 1, frond; 2, portion of a pinna (primary branch) with the fructification; 3, the clusters of spore-cases (sori); 4, the root (caudex, or rhizome); 5, the stipe.

TRIBE I.—**Polypodiæ**. (See p. 133). Spore-cases in nearly circular, usually pedicelled groups, without an indusium (cover).

SYNOPSIS OF THE GENERA.

Polypodium. Clusters of spore-cases circular, bare (not covered).

Allosorus. Clusters of spore-cases becoming confluent and covered by the reflexed margin of the frond.

Gymnogramma. Clusters of spore-cases linear.

I. *Polypodium*, Sm. in part. Rhizomes more or less creeping. Fronds (leaves) pinnatifid or pinnate or bi-tri-pinnate. Spore-cases in roundish groups (clusters), scattered irregularly on the under side of the frond, or disposed in regular lines (series), without an indusium.

1. ***P. vulgare***, Linn. Common Polypody. E. B. 1149, L. C. 1374. Root (rhizome) creeping, slightly fleshy, invested with scarious brown scales. Fronds *oblong-lanceolate*, *pinnatifid*, on a rather long rach, with oblong-lanceolate alternate lobes, entire, or more or less toothed, rather contiguous, more or less confluent at their base; lateral veins divided into three-four branches, rarely in five (on vigorous fronds). Clusters of spore-cases large, in two rows, which are parallel with the middle nerve of the lobe of the frond, each spore-case growing out of the shortest of the lateral nerves (secondary nerves). The fruit is produced during almost the whole year. On old walls, stumps and roots of trees, rocks, and shady places. Perennial. June—October.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—700 yards. T. 52°—40°.

Var. *β. bifidum*. Lobes widely serrated and irregularly forked.

Var. *γ. serratum*. Lobes pointed and deeply serrated.

Var. *δ. cambricum*. Lobes pinnatifid, with acute serrated segments.

Var. *ε. hibernicum*. Lobes partially pinnatifid.

2. ***P. Phegopteris***, Linn. Mountain Polypody. E. B. 2224, L. C. 1375. Root (rhizome) or caudex creeping, slender, dark-coloured, with numerous black fibres. Fronds with a triangular outline, pinnate below and pinnatifid above (*the lower pair of pinnæ divaricated and deflexed*), the upper pinnæ are united at their base; pinnæ pinnatifid with oblong, blunt, crenate segments. The whole herbage is pale green, delicate or tender, hairy. The stipe or rach (rachis) is very slender, slightly scaly at the base, hairy, quite as long as that part which bears the expanded part of the frond. The spore-cases are in round and contiguous clusters, and near to the margin. In shady moist places. Perennial. July—September.

A. 1, C. 60. Lat. 50°—61°. Alt. 0—1100 yards. T. 49°—35°.

3. ***P. Dryopteris***, Linn. Oak Fern. Three-branched Polypody. E. B. 616, L. C. 1376. Root slender (wiry), creeping, dark-coloured, slightly scaly. Stipe longer than the expanded part of the frond, very slender, brittle, and smooth. Fronds *triangular in outline*, *ternate*, and each of the three primary divisions is *triangular or rhomboidal*, *the central or upper one is on a longer stipe than either of the two lateral ones*; ultimate lobes oblong-lanceolate, obtuse, slightly crenate; the secondary or lateral nerves reach the margin of the lobes. Clusters of spore-cases small, produced near the extremity of the lateral (second-

ary) nerves close to the margin. In shady mountainous places, especially fine near waterfalls. At the Falls of Acharn, near Taymouth, some of the fronds were from twelve to eighteen inches high. Perennial. July—September.

A. 13, C. 60. Lat. 51° — 59° . Alt. 0—900 yards. T. 48° — 37° .

4. **P. calcareum**, Sm. *P. robertianum*, Hoff. Limestone Polypody. E. B. 1525, L. C. 1377. Roots dark brown, creeping, stouter than in *P. Dryopteris*. Fronds triangular in outline, but not so decidedly ternate as the preceding species is. Stipe rigid, scaly, and glandular, much longer than the expanded part of the frond. The primary divisions of the frond are on shorter secondary stipes; they are also more in the same plane, and the lateral and lower pair are smaller in proportion than the upper and central one is. In large fronds the lower pinnæ are again pinnate (bipinnate). Whole plant glandular. Plentiful on exposed calcareous mountains and exposed places, in Derbyshire and Yorkshire. Perennial. July—September.

A. 11, C. 15. Lat. 51° — 55° . Alt. 50—300 yards. T. 49° — 45° .

5. **P. alpestre**, Spr. *Pseudathyrium alpestre*, Newman. Alpine Polypody. Root (rhizome) short, decumbent, separating into several crowns or distinct axis of growth. Frond lanceolate, bipinnate, tapering at both ends; pinnules (ultimate segments) pinnatifid, with sharply serrated lobes; stipes very short and scaly at the base, and there the pinnæ are very short and deflexed. The spore-cases are in round clusters on the lateral (secondary) nerves between the mid-nerve of the lobe and the mid-nerve of the pinnule; some of the lowermost lobes bear a cluster of spore-cases on each side of the mid-nerve of the lobe. This Fern in its dwarf state is said to resemble *Cystopteris fragilis*, and in a luxuriant condition it has the appearance of *Athyrium Filix-femina*. It is not uncommon on some Scottish mountains between 2000 and 4000 feet altitude. From 2000—3000 feet of vertical height it grows with *Athyrium Filix-femina*; from the latter altitude to 4000 feet, the Lady-fern disappears and this alpine species takes its place. Mountains in Perthshire, Forfarshire, &c. Perennial. May—September.

A. 2, C. 4. Lat. 56° — 57° . Alt. 800—1000 yards. T. 39° — 36° .

Note.—The general aspect of this Fern is that of an under-sized *Athyrium Filix-femina*. The fructification resembles that of *Polypodium*.

First observed by Mr. H. C. Watson in the great Corrie of Ben Alder, on the west side of Loch Errecht, Inverness-shire, in 1841. Also in Canlochan Glen, Forfarshire, by the same botanist, in 1844.

6. **P. flexile** (*Pseudathyrium flexile*, Newman). Flexible Alpine Polypody. This rare Fern has probably the same range as *P. alpestre*.

This Fern differs from the above *P. alpestre* in its much narrower, lanceolate, more lax or open frond. The shape or outline of the frond and the short pinnæ and short pinnules are apparently the only characters which distinguish this species, if a species it be, from *P. alpestre*. Glen Prosen, Clova mountains, Forfarshire. Mr. J. Backhouse, jun. "Phytologist," vol. iv., p. 974. Perennial. May—September.

II. *Allosorus*, Bernh. Fronds of two kinds, barren and fertile fronds. Spore-cases (sori) circular, attached near the summit of the secondary (lateral) nerves (near the margin), becoming confluent, covered by the revolute margin of the ultimate lobes of the fertile fronds. The secondary nerves do not extend quite to the margin.

***A. crispus*, Bernh.** Mountain Parsley. Parsley Fern. Rock Brakes. E. B. 1160, L. C. 1378. Root short, decumbent. Fronds bi-tripinnate with a triangular outline, and the stipes are at least half the length of their respective fronds. Barren fronds tripinnate, with alternate pinnæ, pinnules, and lobes; the latter are cuneate and cleft; fertile fronds taller and not so close or bushy as the barren fronds are; the lobes or ultimate divisions of these are linear-oblong; the reflexed margins nearly meet over the lobe, and cover the spore-cases. On rocks and walls in mountainous districts. Perennial. June—September.

A. 15, C. 40. Lat. 51° — 59° . Alt. 150—1150 yards. T. 46° — 35° .

III. *Gymnogramma*, Desv. This genus is mostly composed of tropical species, which are generally distinguished by a yellow or white powdery substance, hence called Gold and Silver Ferns. Fronds bipinnate, with linear, forked spore-cases on the back of the secondary nerves. (?) Nerves free, forked, or pinnate.

***G. leptophylla*, Desv.** Slender Gymnogram, Moore's "Hand-book of British Ferns," p. 63. Root (rhizome) annual or biennial, fibrous. Fronds of two kinds; the barren one a very delicate fan-shaped frond, on a very slender stipe, with two-three lobes; the whole not more than an inch high (long). The fertile fronds are pinnate, erect, several times as long as the barren fronds, and with obliquely fan-shaped three-lobed pinnæ; these medium fronds have only a sprinkling of spore-cases. The longer fronds are more divided, taller, and produce more fructification; these are four-six inches high, with a stipe about half the length of the whole frond. These tallest fronds are bipinnate, and the spore-cases are nearly central and confluent. Discovered in Jersey in 1852. Annual or biennial. May, June.

***Aspidiæ*, (See p. 133).** Spore-cases in round clusters with a scale-like indusium, and springing from the back of the lateral nerves.

SYNOPSIS OF THE GENERA.

Lastrea. Spore-cases covered by a reniform indusium, which is attached by its edge to the frond.

Polystichum. Spore-cases covered by a peltate indusium, which is attached to the frond by its centre.

Cystopteris. Spore-cases covered by a hooded indusium, which is attached by its broad base.

Woodsia. Spore-cases surrounded by a fringed involucre.

IV. *Lastrea*, Presl. Leaves bi-tri-pinnate or bi-tri-pinnatifid. Spore-cases in round, solitary clusters on the secondary nerves or

disposed in regular series. Indusium *reniform*, *roundish*, attached by a short pedicel at the notch (base). Secondary nerves simple or branched.

1. **L. Filix-mas**, Presl. Male Fern. Shield Fern. Buckler Fern. E. B. 1458, L. C. 1388. Root large, in tufts, or creeping. Fronds oblong-lanceolate, pinnate; pinnæ spreading, *lanceolate*, *pinnatifid*, with numerous pairs of lobes (fifteen-twentyfive) decreasing in length at both ends; lobes oblong-obtuse, connate at their base (adhering together by the whole base). Crenulate below, toothed above; the lower lobes distinct, the upper confluent. Stipes or rach sometimes short sometimes long, always more or less scaly. Indusium *persistent*. Clusters of spore-cases moderately large, *usually on the lower or basal part of the ultimate divisions or lobes*. About hedges, ditches, and shady places. Perennial. June—September.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—500 yards. T. 52° — 41° .

Var. *β. incisa*. This differs from the typical form by its pinnæ (primary divisions of the frond) being pinnate at their base, the pinnules are incised and the lobes are serrated; the spore-cases are more numerous, extending further up the pinnules, presenting a more regular disposition of the fructification than is exhibited by the typical form.

Var. *γ. paleacea*. Stipes very hairy or scaly. Surface of the frond shining above, glaucous below.

Var. *δ. abbreviata*. This variety is distinguished by its small size (eight-sixteen inches high), by the pinnæ being pinnate at the base and of a triangular-lanceolate outline. Its stipe is very hairy.

Var. *ε. pumila*. This is a dwarf rigid form, six-ten inches high, with linear pinnatifid pinnæ. The spore-cases are in parallel rows, on each side of the midrib of the primary divisions.

Var. *η. cristata*. Fronds narrow and lanceolate, with linear rather distant pinnæ, which are divided at their extremities and form a beautiful tasseled tuft of curled segments. A very handsome Fern.

Query.—Has this form been observed in an uncultivated state?

2. **L. rigida**, Presl. Rigid Male Fern. E. B. 2724, L. C. 1389. Root decumbent, with long wiry fibres. Fronds *triangular-lanceolate bipinnate*, open or lax; pinnæ lanceolate, pinnate for about half their extent; pinnules oblong, blunt, serrated or pinnatifid (the latter at their base); ultimate segments rounded with two-five not spinous teeth. Stipe short and scaly. The rach and surface of the frond are *besprinkled with minute sessile glands*. Indusium *beset with glands*, persistent. Mountainous districts in Yorkshire and Westmoreland. Perennial. June—September.

A. 3, C. 3. Lat. 53° — 55° . Alt. 400—500 yards. T. 45° — 43° .

3. **L. cristata**, Presl. Crested or Prickly-toothed Male Fern. E. B. 2125, L. C. 1387. Root creeping, stout, occasionally branched. Fronds narrow, linear-oblong or lanceolate, pinnate or bipinnate, with sharp spinous teeth. Scales of the stipes ovate. Indusium *without marginal glands*.

A. 3, C. 4. Lat. 52° — 54° . Alt. 0—100 yards. T. 48° — 47° .

Note.—The above description includes the three following forms:—

Var. *a. cristata*. *L. cristata*, Presl. Bab. Newm. &c. E. B. 2125, L. C. 1387. Frond narrow, oblong, pinnate; pinnæ triangular, oblong, short, with oblong segments almost always connected at the base, and serrated or obscurely lobed, each lobe or tooth is tipped with a short, erect, callous point. Stipe at least one-third of the length of the frond.

Var. *β. uliginosa*, Moore. *L. uliginosa*, Newman. Fronds lanceolate, tapering slightly towards the base, bipinnate. Pinnæ triangular, pinnate at the base (the lower pinnules are distinct or on short stalks, the upper lobes confluent); pinnules oblong, blunt, toothed; teeth awned. The pinnules at the base of the frond are nearly equal to those on the upper part of it.

Var. *γ. spinulosa*. Fronds more triangular than in the preceding, bipinnate; pinnules oblong, incised or toothed; teeth terminating in longish awns. The lower pinnules are much larger than the upper ones (viz., the pinnules at the base of the pinnæ do not decrease so rapidly as they do in var. *uliginosa*). The lowermost pair of pinnæ are as large as the next pair; this is not the case in *uliginosa*, where the pinnæ increase up to near the centre of the frond.

Note.—These three forms are here united in deference to the opinion of Mr. T. Moore, the author of "The Handbook of British Ferns." The first form, *L. cristata* is very local, but found in boggy places or heaths in the counties of Suffolk, Norfolk, Huntingdonshire, Staffordshire, Cheshire. (?) *L. spinulosa* is a widely-distributed Fern. The var. *uliginosa*, if variety it be, is generally found in company with *cristata*. They are all perennial, as almost all Ferns are, and are in fructification from June to September.

4. *L. dilatata*, Presl. Broad Prickly-toothed Fern. E. B. 1461, L. C. 1391, 1391 b. Root large, tufted, with a densely scaly crown, Fronds triangular-ovate or oblong-lanceolate, bipinnate (some examples occur in which the base of the pinnules is deeply pinnatifid, hence the plant appears tripinnate). Stipe usually long, furnished with entire lanceolate scales. Indusium fringed with stalked glands.

A. 18, C. 80. Lat. 50°–60°. Alt. 0–1200 yards. T. 52°–35°.

Note.—The whole plant is glandulose, and the indusium is not persistent. When the spore-cases expand, the indusium is concealed in the mass. In woods and hedges. Perennial. June–September.

Var. *β. collina*, Moore. Fronds narrow, triangular-ovate, bipinnate. Pinnæ lanceolate; pinnules oblong, obtuse, ultimate lobes rounded, terminating in a short awn. Stipes long (nearly half as long as the whole frond), slightly scaly.

Var. *γ. dumetorum*. *Aspidium dumetorum*, Smith. Eng. Fl., iv. 281. Frond triangular, broader in proportion at the base than *β. collina*, which has something of an ovate shape; the ultimate lobes are rounded and terminated by a short awn, just as the same parts of *β. collina*. This form of this variable species is very common in mountainous places in Yorkshire, especially in the Craven district.

Var. *δ. Khanteri* is a variety similar to the above, but rather more open. The serratures of the lobes are smaller and more regular.

Var. *ε. glandulosa*. Frond elongate, rather open, with slender pinules. Under side densely covered with glands. Stipe rather slender, with pale, lanceolate scales.

Note.—The distinguishing characteristics of this section, *L. dilatata*, consist in the not-creeping rhizomes, the broader fronds, and pale or deep brown, usually broad, scales. In the *cristata* section the rhizome creeps, the frond is narrower, and the scales are fewer and smaller than in the *dilatata* group.

5. *L. æmula*, Brack. *L. foeniculii*, Watson. *L. recurva*, Newman, 225. Hay-scented Fern. Root large, tufted. Frond triangular, bipinnate (described as tripinnate, but it is just as much divided as luxuriant forms of *L. dilatata* are, and not more); pinnæ triangular-lanceolate, incurved with incised spinulose lobes; teeth tapering, mucronate, and incurved (or pointing upwards). Indusium fringed with minute sessile glands. The colour of the entire frond is of a beautiful yellowish-green, and the scent is compared to that of new hay. Not rare in many parts of the west and north of England, in Ireland, and in Scotland. In rocky, shady places. Perennial. June—September.

A. 10, C. 30. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

6. *L. Thelypteris*, Presl. Marsh Fern. E. B. 509, L. C. 1385. Root creeping, slender. Frond oblong-lanceolate, pinnate, with distant segments; pinnæ linear-lanceolate, with confluent, oblong, entire lobes. Stipes slender, smooth. The fertile fronds are taller and more robust than the barren fronds. Clusters of spore-cases small, numerous, arranged in two parallel lines on each lobe. This is a local and rare species. It is common in boggy fens in the east of England. Perennial. June—September.

A. 13, C. 30. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—46°.

7. *L. Oreopteris*, Presl. Mountain Male Fern. E. B. 1019, L. C. 1386. Root large, tufted, with numerous black wiry fibres. Fronds pinnate, lanceolate, tapering at both ends. Pinnæ lanceolate, deeply pinnatifid, with oblong-lanceolate, blunt, entire lobes. The spore-cases are marginal, or near the margin; sometimes they are nearly confluent; the thin-toothed indusium soon decays. The under side of the fronds is furnished with numerous yellow glands, which are odoriferous when bruised. This species has a considerable resemblance to *L. Thelypteris*, but it bears spores more freely, is of a larger size, and is very glandular. On open heaths. Perennial. June—September.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—950 yards. T. 51°—37°.

V. *Polystichum*, Roth. Rigid, mostly coriaceous, shining Ferns. Fronds pinnate or bipinnate. Spore-cases in round, central groups. Indusium circular, attached by its centre.

1. *P. aculeatum*, Roth. Prickly Shield Fern. E. B. 1562, L. C. 1383, 1383 b. Root tufted, invested with numerous reddish scales. Fronds bipinnate, lanceolate, tapering both ways, more or

less linear in shape, rigid or leathery; pinnæ lanceolate, or oblong-lanceolate; pinnules oblong, or oblong-rhomboidal, or ovate, decurrent (confluent) at the base; the pinnules contiguous to the rach, especially those on the upper side of the pinnæ, are much larger than the others, and have a more or less large *lateral auricle*, all of them terminate in long bristly awns, and are more or less furnished with lateral awned teeth. Shady places. Perennial. June—November.

A. 16, C. 60. Lat. 50° — 57° . Alt. 0—200 yards. T. 52° — 46° .

Note.—This species is almost evergreen.

Var. *β. lobatum*. In this form the frond is narrower, the pinnules more decurrent or confluent, and the pinnule next to the rach is not so distinctly auricled as in the typical form. The whole frond is close, very rigid, and shining.

Var. *lonchitidioides*. This form resembles *P. Lonchitis*. Frond pinnate, with the pinnules more than usually combined.

2. *P. angulare*, Presl. Angular or Soft Prickly Shield Fern. E. B. 2776, L. C. 1384. Root (rhizome) large, tufted. Fronds bipinnate, rather lax, not so rigid nor so much shining as in *P. aculeatum*; much narrower, and not so much curved laterally; pinnæ lanceolate; pinnules all distinctly stalked with a rounded not tapering base, serrated with teeth which end in sharp prickles. In shady places. Perennial. June—October. This is an evergreen.

A. 12, C. 40. Lat. 50° — 56° . Alt. 0—200 yards. T. 52° — 48° .

Var. *β. subtripinnatum*. Pinnules next to the rach, deeply pinnatifid; pinnules more rounded and laxer.

Var. *γ. angustatum*. Pinnules narrow and acute. This variety is viviparous (produces bulbs) in the axils of the lower pinnæ.

Note.—It is not very easy to distinguish the above two species, *P. aculeatum* and *P. angulare*. The latter has a narrower frond than the former, and is not so rigid in its texture.

3. *P. Lonchitis*, Roth. Alpine Shield Fern. Holly Fern. E. B. 797, L. C. 1382. Root tufted, scaly. Frond linear-lanceolate, tapering at both ends, rigid, six-twentyfour inches high, on a very short stipe. Pinnæ oblong, or ovate, or lanceolate, with a truncate or broad base and a single anterior basal lobe; they are sometimes lunulate and pointed. (This is the character of the fronds from Settle). The margin is usually sharply serrated with spinous teeth; the lower pinnæ are triangular. Rach and bases of the pinnules on the under side very scaly; the upper side is of a bright glossy green. The fructification (spore-cases) is nearly confluent when at maturity. In Wales, north of England, and Scotland, in mountainous parts. Perennial. June—September.

A. 6, C. 15. Lat. 53° — 59° . Alt. 400—1100 yards. T. 43° — 36° .

Note.—The teeth of specimens from Ben Lawers are furnished with longer awns than the fronds from the north of England have. (?)

VI. *Cystopteris*, Bernh. Fronds bi- or tri-pinnate. Spore-cases disposed in oblong-rounded or round clusters, either solitary, on the secondary (lateral) nerves, and scattered or in rows. Indusium reni-

form or lanceolate, hooded, attached by its base beneath the spore-cases (sori), toothed or slightly lacinated.

1. **C. fragilis**, Bernh. Brittle Bladder Fern. E. B. 1587, L. C. 1379, 1379 b, 1379 c. Root rather thick, more or less creeping. Fronds bipinnate, lanceolate, four-fifteen inches high, on smooth brittle stipes, which are from one-third to one-half the length of the whole frond. Pinnæ lanceolate or ovate-lanceolate; pinnules oblong or ovate-oblong, obtuse incised, toothed or crenulate. Indusium lanceolate, caducous, longer than the cluster of spore-cases. On moist rocks and old walls, especially in mountainous places. Perennial. June—September.

A. 18, C. 70. Lat. 50° — 59° . Alt. 0—1050 yards. T. 49° — 36° .

Var. *a. vulgaris*. E. B. 1587. This is usually the largest and most dilated form of the plant; the fronds are lanceolate; pinnæ oblong-lanceolate; pinnules ovate-oblong, pinnatifid, incised or serrated. Spore-cases nearly central, finally confluent.

Var. *β. dentata*. E. B. 1588. Frond lanceolate-oblong, narrower than in var. *a.*; also the lobes and teeth are more rounded and entire than in the preceding.

Var. *γ. angustata*. Frond narrow, elongate, more open below and more close above than in the foregoing forms. There are examples of this Fern having a triangular-elongate form and a dull reddish colour.

Var. *δ. dickieana*. Frond ovate-lanceolate, with deflexed pinnæ. A peculiarity of this form is, that the pinnæ do not grow in the same plane as the stipes, but form a considerable angle with it. This direction of the pinnæ is only observable in the recent plant; in the herbarium it will only appear denser. The lobes of this variety are very blunt, and hence it approaches nearer to *dentata* than to *angustata*. First discovered by Dr. Dickie, in a cave on the Kir. cardinshire coast, not far from the fishing town of Finnan, near Aberdeen.

2. **C. alpina**, Desv. Alpine Bladder Fern. E. B. 163, L. C. 1380. This Fern is called by plant-geographers an *alien*, neither a native nor a naturalized subject of the domains of our British Flora. Root short, tufted. Frond lanceolate, nearly tripinnate, six-ten inches high. Pinnæ ovate; pinnules ovate-oblong, deeply pinnatifid, with short linear or cuneate lobes which are more or less obscurely toothed at the apex. This Fern grows in alpine parts of the south of Europe. It has been within the last few years collected sparingly on a wall at Walthamstow, where it was noticed by Mr. Foster above half a century ago. Perennial. June—September.

3. **C. montana**, Link. Mountain Bladder Fern. Hooker, sp. Fil. i. 200. L. C. 1381. Root long, creeping, filiform. Frond tripinnate, triangular, on a very long, somewhat scaly stipe; the lower lateral pinnæ are also triangular and opposite; they are each nearly as large as the central terminal part (all the rest of the frond). It has the general outline and appearance of *Polypodium Dryopteris*. Pinnules of the lower branches (pinnæ) triangular; the outer or lower only are pinnate; ultimate lobes oblong, notched or incised,

with blunt teeth or lobes. Breadalbane, Scotland, in a ravine called Correy Uachdar, between Glen Dochart and Glen Lochay, about seven miles from Killin; also Ben Lawers. Perennial. June—September. First discovered by the late Mr. Gourlie in 1841.

VII. Woodsia, Br. A genus of small neatly-growing alpine Ferns. Fronds pinnate. Spore-cases in round clusters, attached near the extremities of the lateral nerves. Indusium divided at the margin into numerous capillary segments.

1. **W. ilvensis, Br.** Oblong Woodsia. E. B. 2616, L. C. 1373. Root tufted. Frond lanceolate, two-six inches high; the stipe is about one-third of the length of the frond, and *invested with both scales and hairs*. (In the following species the stipe is shorter and quite smooth). Pinnæ opposite or nearly so, oblong, deeply lobed, broadest at the base, with ovate-oblong segments (lobes). (In cultivated specimens the fronds are lanceolate, broader than in *W. hyperborea*, and the pinnæ are pinnatifid with from six-eight lobes.) Rach and under side of the fronds hairy. Spore-cases in nearly marginal clusters which ultimately are confluent. Wales, north of England, and Scotland; rare. Perennial. June—September.

A. 5, C. 6. Lat. 53°—57°. Alt. 650—700 yards. T. 41°—40°.

2. **W. hyperborea, Br.** Alpine Woodsia. E. B. 2033, L. C. 1373*. Root thick, tufted. Frond lanceolate, or linear-lanceolate, tapering at both ends. Pinnæ triangular, blunt, with rounded lobes, which are either entire or bluntly toothed. In cultivated or luxuriant specimens each pinna has three-four rounded lobes. The rach, bases of the pinnæ, and the under side of the frond generally *bear a few soft hairs*. Fructification covering nearly all the back of the lobes of the pinnæ, and becoming nearly confluent. Snowdon, Ben Lawers, and Clova mountains; rare. Perennial. June—September.

A. 2, C. 2. Lat. 53°—57°. Alt. 800—900 yards. T. 40°—38°.

Aspleniceæ. Fronds simple or pinnatifid, or variously pinnate; spore-cases oblong or elongate in form; indusium scale-like.

SYNOPSIS OF THE GENERA.

Athyrium. Fronds *bipinnate*; spore-cases oblong, curved; indusium attached by the concave (curved edge); the free margin fringed.

Asplenium. Fronds variously divided; spore-cases in elongate groups, with a straight indusium, which is attached by its outer side.

Scolopendrium. Frond *simple*, entire or crenulate at the margin. Spore-cases elongate, straight, in parallel pairs; indusium attached to opposite sides of the proximate (twin) spore-cases.

Ceterach. Fronds *pinnatifid*; spore-cases elongate, scattered among imbricated chaffy scales; indusium obsolete.

VIII. Athyrium, Roth. Fronds bipinnate, lanceolate, or somewhat ovate-lanceolate, tapering at both ends. Spore-cases central (medial), short, oblong, or lunulate (somewhat crescent-shaped). Indusium of the same form as the *sori* (spore-cases), opening along the side next the mid-nerve, with a fringed margin.

1. **A. Filix-fœmina**, Roth. Drooping Lady Fern. E. B. 1459 (bad), L. C. 1393. Root stout, tufted, decumbent. Fronds *bipinnate*, *broadly lanceolate* or *oblong-lanceolate*, two-four feet high; *pinnæ lanceolate*, *acuminate*, and *acute*; *pinnules oblong-lanceolate*, *deeply pinnatifid*, with variously toothed lobes. Spore-cases *oblong*, *rounded*. *Indusium persistent*. Fructification in two rows parallel with the mid-nerve, often confluent when at maturity. In woods and boggy places. Perennial. June—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—500 yards. T. 52°—41°.

Var. *β. latifolium*. Fronds lanceolate, *pinnæ approximate*; spore-cases in clusters, which are arranged in single rows opposite the midrib, and distant from it.

Var. *γ. molle*. Fronds broadly lanceolate, *lax*. Spore-cases in clusters, which are in rows near to the midrib.

Var. *δ. marinum*, Moore. Fronds lanceolate, *equally attenuated* at both ends. Spore-cases in broad distinct clusters near the base of the pinnules.

2. **A. rhœticum**, Roth. Erect Lady Fern. *A. convexum*, Newman, 245. *Aspidium irriguum*, Sm. E. F. iv., 283. Fronds *bipinnate*, *lanceolate*; *pinnæ distant convex*; *pinnules linear*, *pointed*, *deeply pinnatifid*, *with incurved (recurved?) lobes*; spore-cases very short and numerous, near the midrib becoming confluent. This elegant form is not unfrequent in many parts of Surrey and Yorkshire. In dry and also boggy places, either exposed or sheltered. Perennial. June—September.

Range not stated in the "Cybele," or it is given under *A. Filix-fœmina*. It is probably widely distributed, but it is not so common as the preceding form or species.

There are many beautiful monstrosities of the elegant Lady Fern, viz., *multifidum*, in which the tips of the fronds and of the *pinnæ* are divided and crisp; *ramosum*, in which the apex of the frond is divided into numerous, narrow segments, the apices of the *pinnæ* are lacerated (torn); *crispum*, a dwarf form, with an irregularly branched rach (stipe bearing the *pinnæ*), and having the apices of the divisions dilated and crisped.

3. **A. fontanum**, Bernh. (See *Asplenium fontanum* below).

IX. Asplenium, Linn. in part. Fronds *pinnate* or *bi-tri-pinnate*. Spore-cases in clusters, either *linear*, *scattered*, or *solitary*, on the secondary (lateral) nerves, sometimes rounded when no longer covered by the indusium. Indusium membranous, attached by one side to the secondary nerve; the other side, which is adjacent to the median nerve of the lobe, is free.

1. **A. Adiantum nigrum**, Linn. Black Spleenwort. E. B. 1950, L. C. 1399. Roots (rhizomes) tufted, usually crowned by the stipes of the decayed fronds. Fronds *bi-tri-pinnate*, *with lanceolate acute segments*, six-twelve inches high, *triangular-lanceolate* *acuminate*, deep green and shining above; ultimate segments *oblong*, *attenuated* at the base, and *toothed* at the summit. Groups of spore-

cases *oblong-linear* before they are covered by the indusium, and before they are confluent, when they cover the entire back of the frond. Under hedges, and on rocks and walls. Perennial. June—October.

A. 18, C. 80. Lat. 50° — 60° . Alt. 0—650 yards. T. 52° — 41° .

Var. *acutum*. Ultimate lobes linear-lanceolate; teeth longer than in the common form. Ireland and West of England. Rare.

2. **A. lanceolatum**, Huds. Lanceolate Spleenwort. E. B. 240, L. C. 1398. Roots (rhizomes) tufted. Fronds *oblong-lanceolate*, thinner or less leathery than the preceding, bipinnate, primary branches (segments) oblong, ovate or lanceolate, the lower shorter than the central ones; ultimate divisions (lobes) *obovate*, dilated, serrated with acuminate teeth. Groups of spore-cases as in the preceding species. In shady, rocky places in the south and west of England. Perennial. June—September.

A. 6, C. 10. Lat. 50° — 54° . Alt. 0—200 yards. T. 52° — 46° .

Var. *connata*. (?) Frond pinnate, with ovate, crisp and sharply toothed pinnæ. This variety is produced by the growing together of the pinnules (secondary divisions). It has been found in Cornwall.

3. **A. fontanum**, Bernh. Smooth Rock Spleenwort. E. B. 2024, L. C., Excluded species. Root (rhizome) short, thick, scaly. Fronds *oblong- or linear-lanceolate*, bipinnate with *obovate* pinnules tapering towards their base. Teeth large, mucronate, two-four on each lobe, tapering both ways. *Four-six inches high*, erect, quite smooth (the stipe and rach only slightly scaly). Stipe short. Rach winged. Spore-cases in short oblong clusters. On old walls. Found on Agmondsham Church, Bucks, some time in the last century; more recently by the Rev. W. Hawker, on a wall at Ashford, near Petersfield. Perennial. July—September.

A. 3, (?) C. 5, (?) Lat. 51° — 57° . Alt. 0—50. (?) T. — (?)

4. **A. marinum**, Linn. Sea Spleenwort. E. B. 392, L. C. 1397. Root tufted, scaly. Fronds linear-lanceolate, more or less tapering, pinnate; pinnæ oblong or ovate, with a broad, oblique base, serrated with unequal, blunt teeth, smooth, shining, *leathery*; height variable, from a few inches to two feet; stipe about *one-third of the length of the frond*, and both it and the rach are winged. Spore-cases in oblong or linear clusters, parallel to the secondary nerves, and forming an acute angle with the mid-nerve of the lobe. Rocks on the sea-shore. Perennial. June—September.

A. 14, C. 40. Lat. 50° — 60° . Alt. 0. T. 52° — 46° .

Var. *acutum*. Pinnæ narrower, elongate, lobed, and crisped.

5. **A. Trichomanes**, Linn. Common Spleenwort. E. B. 576, L. C. 1396. Root (rhizome) tufted. Fronds pinnate, numerous, tufted, linear, slightly attenuated at both ends, with numerous *ovate rhomboid or rounded* pinnæ, which are usually crenulate, rarely incised. Stipe very short; rach filiform, *black and shining*; spore-cases in linear or oblong clusters in two rows on each lobe (segment or pinnæ), situated obliquely to the mid-nerve (forming an acute angle

with the nerve); when no longer covered with the indusium they are confluent. On old walls, shaded rocks, and similar places. Perennial. June—September.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—700 yards. T. 52°—42°.

Var. *a. incisum*. Pinnæ pinnatifid, or incised, with narrow serrated or incised segments.

6. **A. viride**, Huds. Green Spleenwort. E. B. 2257, L. C. 1395. Root (rhizome) tufted. Fronds pinnate, on short brownish-black stipes, with a *bright green rachis*; the colour of the entire frond is a *bright, full green*. Pinnæ triangular or oblong, with a very oblique base, and on very short filiform stalks, with lobed or toothed margins. The spore-cases are in linear or oblong groups, nearer to the centre than to the margin of the pinnæ. In this species the apex has a tendency to become forked. In mountainous districts of England, Wales, and Scotland, on sheltered rocks. Perennial. June—October.

A. 12, C. 30. Lat. 51°—59°. Alt. 100—950 yards. T. 48°—38°.

7. **A. Ruta-muraria**, Linn. Wall Rue, or Rue-leaved Spleenwort. E. B. 150, L. C. 1400. Root (rhizome) tufted. Fronds tufted, usually numerous, *bipinnate, triangular* or deltoid in general outline; stipe *green, longer than the rachis* (the part which bears the branches, or pinnæ) the whole somewhat leathery in texture; ultimate segments obovate, cuneate (tapering towards the base), usually toothed at the apex. Spore-cases in linear, or in oblong groups, when no longer covered by the indusium, then they become confluent and cover the entire under surface of the lobe or lobes. On walls and rocks. Perennial. In fructification during the whole year. A variety or sub-variety, approaching the next species, is occasionally found in shaded parts, as on the interior of ruins, &c. A very remarkable one was collected at Brambletye House twenty years since.

A. 18, C. 80—75. Lat. 50°—59°. Alt. 0—200 yards. T. 52°—46°.

8. **A. germanicum**, Weiss. Alternate-leaved Spleenwort. E. B. 2258, L. C. 1400 b. Root (rhizome) tufted. Fronds *lanceolate in outline* (oblong, linear), *pinnate* (in luxuriant fronds, bipinnate at the base); pinnæ (segments) *elongate cuneate*, incised or toothed at the apex; *stipe longer and slenderer than the same part in A. Ruta-muraria*. Clusters of spore-cases linear; when they obliterate the indusium they are confluent. This rare Fern has been reported from Cumberland, from Wales, and from several localities in Scotland. It is not a common plant on the Continent. Perennial. June—August.

A. 3, C. 4. Lat. 53°—57°. Alt. 100—200 yards. T. 46°.

9. **A. septentrionale**, Hull. Forked Spleenwort. E. B. 1017, L. C. 1401. Root (rhizome) tufted. Fronds two-six inches high, numerous, on a stipe which is twice as long as the part which bears the branches (sometimes the *frond is quite simple*, the upper part, which bears the fructification, being only slightly dilated); branches (pinnæ or segments?) two-four *linear, elongate*, alternate, *entire*, or *forked at the summit* in luxuriant plants. Spore-cases in linear, elongate clusters; when confluent covering the entire under surface

of the lobe or frond, except the apex. Rare. On rocks and old walls. Perennial. June—September.

A. 7, C. 12. Lat. 51° — 57° . Alt. 150—1000 yards. T. 47° — 37° .

X. *Scolopendrium*, Sm. Fronds narrow, lanceolate, cordate at the base. Spore-cases in linear parallel groups obliquely-placed in reference to the middle nerve, and situated on the contiguous forks of two adjacent nerves. Indusium membranous, united on one side with the secondary nerve, and free on the other; the two *indusia* thus present the appearance of a two-valved indusium.

S. *officinale*, Sm. Hart's Tongue Fern. E. B. 1150, L. C. 1402. Root (rhizome) tufted, often crowned by the remains of the decayed fronds. Fronds in a tuft, oblong-lanceolate, slightly contracted near the base, cordate, with blunt auricles, variable in size, four-thirtysix inches, on stout scaly (hairy) short stipes, lively green, shining. Lateral nerves repeatedly and regularly forked, and not reaching the margin of the frond. On moist shady places. Old walls, deep gullies, and similar places. Perennial. June—September.

A. 17, C. 75. Lat. 50° — 61° . Alt. 0—200 yards. T. 52° — 45° .

Var. *a. lobatum*. Apex of the frond, more or less divided, the lobes being sometimes simple, sometimes variously divided, and dilated and crisped.

Var. *β. crispum*. Fronds narrow and much undulate. A beautiful variety.

Var. *γ. polyschides*. Fronds deeply and irregularly crenate or lobed, or both. This variety is narrower than the common form is.

"This fern affords a very decided example of one prevalent condition of distribution which may be traced in the greater number of British plants, though seldom so strongly marked as in the present instance; namely, the tendency of plants to linger along the coast line to a higher northern latitude than that at which they will exist in inland situations. * * * The *Scolopendrium* is not a maritime species, and yet all its recorded stations in the northern provinces appear to be on or near the coast line. I never met with it in the glens or valleys of the Highlands, the humid climate and sheltering rocks of which would seem to be well adapted to its growth, and of which the general vegetation is similar to that of Orkney and Shetland, where the *Scolopendrium* is recorded as still found."—Mr. H. C. Watson in "Cybele," vol. iii., pp. 283-4.

XI. *Ceterach*, Willd. Fronds pinnatifid, with entire, blunt lobes. Spore-cases continuous in linear or oblong groups, scattered, intermixed with a great number of scarious brownish scales, which grow all over the under side of the frond. Indusium wanted.

C. *officinatum*, Willd. (Bauhin. Pin. 354). Common Scale Fern. E. B. 1244, L. C. 1732. Root (rhizome) tufted. Fronds numerous, lanceolate, tapering at both ends, six-ten inches long, deeply pinnatifid, with triangular or ovate, blunt segments, margins entire, or lobed in luxuriant forms confluent at their bases; stipe

short, scaly. The under surface of the lobes is covered with rust-like shining scales, among which is the clusters of spore-cases; the upper surface is a lively green. On old walls and rocks. Perennial. June—October.

A. 15, C. 50. Lat. 50°—57°. Alt. 0—200 yards (500 ?). T. 52°—46°.

Pteridæ. Fronds bi-tri-pinnate. Spore-cases in linear continuous or interrupted groups, covered by the reflexed margin of the frond.

SYNOPSIS OF THE GENERA.

Pteris. Spore-cases (sori) continuous.

Adiantum. Spore-cases not continuous, oblong or rounded.

XII. Pteris, Linn. in part. Fronds bi-tri-pinnate. Spore-cases close to the margin of the lobes and covered by their attenuated margins, which supply the place of a real indusium.

P. aquilina, Linn. Common Brakes, or Bracken. E. B. 1679, L. C. 1404. Root (rhizome) creeping. Frond bi-tri-pinnate, triangular-ovate, on a very long robust stipe, which is deeply buried in the earth, and of a blackish or brown colour; primary branches often on very long stalks, and the form of these primary divisions is ovate-triangular like that of the entire frond; the secondary pinnæ (pinnules) are lanceolate; ultimate divisions (lobes) triangular-elongate, with reflexed margins. Woods, parks, and commons. One of the commonest Ferns. Perennial. July—September.

A. 18, C. 82. Lat 50°—61°. Alt. 0—650 yards. T. 52°—40°.

XIII. Adiantum, Linn. Fronds bi-tri-pinnate. Spore-cases marginal. Indusium membranous, formed of the reflexed apices of the lobes. The spore-cases are in small roundish groups close to the margin, and soon are confluent.

A. Capillus Veneris, Linn. Maiden-hair Fern. E. B. 1564, L. C. 1405. Root (rhizome) black, scaly, creeping. Fronds on long slender (filiform) stipes, which are slightly scaly at the base, and black and shining upwards. The form of the frond is usually ovate, or sometimes oblong, or even lanceolate, bipinnate; pinnæ alternate, of the same shape as the frond; pinnules (ultimate divisions) fan-shaped, usually with a cuneate base, all more or less incised (cut), but the fertile pinnules more deeply cut than the barren ones. They are all attached to the primary rach by hair-like stalks. Spore-cases in oblong marginal groups, covered by the reflexed bleached lobes, which become a sort of indusium. Rocks; by the sea-shore, chiefly in the south and west. Perennial. July—September.

A. 3, C. 5. Lat. 50°—55°. Alt. 0. T. 52°—49°.

Blechnæ. Spore-cases in linear continuous groups, parallel with the midrib, and within the margin.

XIV. Blechnum, Linn. in part. Fronds of two kinds, simply pinnatifid. Indusium scarious, attached by the side which is opposite and contiguous to the margin of the lobe, free on the side next the nerve.

B. *spicant*, With. *B. boreale*, Sw. Hard Fern. E. B. 1159, L. C. 1403. Root (rhizome) thick, tufted. Fronds numerous, rigid, glabrous, the barren frond on a short stipe, oblong-lanceolate, narrow, attenuated at both ends; segments oblong-lanceolate, contiguous, sometimes confluent at the base, entire, usually blunt; fertile fronds taller than the barren ones, on longer stipes. Segments *distant*, *linear*, narrow. On open heathy commons and on hilly situations; often in dry ditches and other depressions of the surface. Perennial. June—September. "Taking both horizontal and vertical range into account, this is perhaps the most widely distributed of all our Ferns; *Lastrea dilatata* being its nearest ally or rival in this respect."—Mr. H. C. Watson in "Cybele," vol. iii., p. 285.

A. 18, C. 80. Lat. 40° — 61° . Alt. 0—1300 yards. T. 52° — 34° .

Hymenophylleæ. The spore-cases are receptacles, surrounded by urn-like or two-valved involucre.

SYNOPSIS OF THE GENERA.

Hymenophyllum.—Receptacles two-valved.

Trichomanes.—Receptacles urn-shaped.

XV. *Hymenophyllum*. Smith. Fronds membranous, pinnate. Spore-cases oblong (vertically), disposed round a columnar receptacle, with an urceolate two-valved involucre, which is of the same texture as the frond.

1. ***H. Tunbridgense***, Sm. Tunbridge Film Fern. E. B. 162, L. C. 1407. Root (caudex) creeping, filiform, closely attached to the rocks and stones on which it grows. Fronds lateral, pinnate, lanceolate ovate, two-four inches long; pinnæ pinnatifid, connected by a narrow wing extending along the rach; the ultimate segments *linear*, blunt, with a spinously-serrated margin. Fructification alternate on the first secondary nerve, surrounded by *two roundish valves, which are spinously serrated on the upper margin*. On rocks near Tunbridge Wells, and in other parts of Sussex. Perennial. July—September.

A. 10, C. 20. Lat. 50° — 57° . Alt. 0—400 yards. T. 52° — 47° .

2. ***H. unilaterale***, Willd. *H. Wilsoni*, Hooker. Wilson's Film Fern. E. B. 2686, L. C. 1408. The root and frond of this Fern closely resemble the preceding. The pinnæ are usually described as somewhat unilateral (subsecund), and it is probably a characteristic mark. The ultimate segments are rather fewer and broader than in the above, *not quite so linear* in shape. The involucre furnish the only distinctions of value. In *H. Tunbridgense*, the valves (receptacles) are roundish, flat, and spinously serrated. In *H. unilaterale* the valves are *ovate-oblong, convex* (inflated), and *the margins are quite entire*. In Wales, North of England, and Scotland; in mountainous parts. Perennial. July—September.

A. 13, C. 40. Lat. 50° — 61° . Alt. 0—950 yards. T. 49° — 37° .

XVI. *Trichomanes*, Linn. Fronds tri-quadri-pinnatifid.

Spore-cases (sori) in marginal oblong (vertically) compressed groups, sessile, arranged on columnar, filiform receptacles, surrounded by urn-shaped involucre of the same texture as the frond.

T. radicans, Swartz. Creeping Bristle Fern. E. B. 1417, L. C. 1406. Root (rhizome) long, creeping, dark-coloured. Fronds tri-quadri-pinnatifid, triangular or ovate, six-twelve inches high, with a rigid, rather stout stipe and rach, and with rigid or stiff lateral branches, all of which are connected by delicate, semi-translucent, membranous expansions of the tissue. This Fern might be quite as lucidly described by the term tripinnate, the rach, the primary and secondary branches, being each respectively furnished with a membranous expansion, usually called a *wing*; ultimate lobes cuneate, consisting of prominent nerves, also connected by membranous tissue. The fructification is produced on the conspicuous stiff nerves which extend somewhat beyond the margin. Ireland. It was found not long ago near the Turk Waterfall. Lakes of Killarney. Perennial. September.

A. 1. Hibernian "was long supposed to have been found wild in Yorkshire."—"Cybele."

Osmundææ. Fructification forming irregular densely-branched panicles at the apex of the fronds.

XVII. Osmunda, Linn. Fronds bipinnate. Fructification densely-clustered on contracted rach-shaped portions of the frond, forming an irregular terminal panicle. Spore-cases large, reticulated, roundish, stalked, two-valved, opening vertically.

1. **O. regalis**, Linn. Royal Fern. E. B. 209, L. C. 1409. Roots tufted, often forming immense tumps, which are two-three feet high. Fronds bipinnate, oblong, oblong-lanceolate, with oblong, nearly entire, ultimate divisions, truncate or slightly auricled at the base. Fertile fronds (some of the fronds are barren) with linear contracted lobes, which form a panicle of spore-cases. In this Fern the stipe is stout, variable in length, smooth, and somewhat woody when the plant is mature. The height of the entire frond varies from about two feet to nine or ten feet, some say twelve. Though found in seventeen of the eighteen botanical provinces, it is not a common nor frequent plant in Britain. We have known the plant upwards of thirty years, and we never saw it in above a dozen localities. Chiefly in wet, shady, or open fenny places. Perennial. June—September.

A. 17, C. 60. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

Ophioglossaceæ. Expansion (vernation) of the frond plicate, not circinate; spore-cases without an elastic ring.

SYNOPSIS OF THE GENERA.

Ophioglossum.—Frond *simple*; fructification in a two-rowed *spike*.

Botrychium.—Frond *pinnate*; fructification in a *panicle*.

XVIII. Ophioglossum, Swartz. Fronds branched. Spore-cases

sessile, connate, two-valved, opening transversely, in groups, arranged in two lines along the margin of the contracted branch of the frond.

1. **O. vulgatum**, Linn. Common Adder's Tongue. E. B. 108. L. C. 1411. Root tufted. Frond branched; the barren portion leaf-like, ovate-acuminate, entire at the margin, on a stipe, about half as long as the frond; fertile frond or fertile branch of the frond (contracted) springing from the base of the dilated barren branch, linear or cylindrical, bearing a simple linear spike, which is always shorter than its stalk. The spore-cases marginal in two rows or series; they do not usually extend quite to the apex of the frond. In turfey meadows—damp, shady places. Perennial. June—July.

A. 17, C. 70. Lat. 50° — 61° . Alt. 0—200 yards. T. 51° — 45° .

2. **O. lusitanicum**. Portuguese Adder's Tongue. Fronds usually smaller, barren or dilated branch ovate, shorter, broader in proportion than in *O. vulgatum*, and not acuminate. Two fronds usually spring up together (in a cultivated specimen), and the plant flowers earlier than the preceding. This form or species was discovered in 1854, (?) by Mr. George Wolsey, in the Island of Guernsey, not far from Petit Bot Bay. On the 17th January it was in full fruit. (See "Phytologist," vol. v., p. 80.)

XIX. Botrychium, Swartz. Fronds branched. Spore-cases large, sessile, round, two-valved, opening transversely, arranged on the contracted branch of the frond, forming a compound unilateral panicle.

B. Lunaria, Sw. Moonwort. E. B. 318, L. C. 1410. Roots tufted. Frond branched like *Ophioglossum*; one branch barren and one fertile; barren branch pinnatifid, with lunulate (crescent shaped) or reniform segments, which are either entire or incised. Fertile branch also pinnatifid, with narrow segments which bear the spore-cases and form a terminal panicle. On hilly pastures and commons. Not frequent. Perennial. June—July.

Var. β . *rutaceum*. Segments of the barren frond lobed or incised. See "Phytologist," vol. v., pp. 175—6.

A. 18. C. 75. Lat 50-61 alt 0-900 yds. 7.50-38.

CLASS II.—MONOCOTYLEDONS.

Monocotyledonous Plants. Herbaceous, rarely ligneous plants (*Ruscus aculeatus* is the sole woody plant indigenous to this country). Ligneous or woody fibres, when present, not arranged in concentric layers (see § 8, 9) but dispersed through the cellular tissue, consequently the bark, wood, and pith are not distinguishable. Stem generally unbranched and rather cylindrical than tapering like a cone. Leaves usually simple, alternate or scattered, rarely opposite, often sheathing at the base, sometimes reduced to scales or altogether absent, with simple and parallel nerves, rarely with divergent and branching nerves. Reproductive organs of two kinds, stamens and

pistils. Seeds composed of distinct parts, with an embryo which shoots forth a radicle enclosed in a sheath, and usually containing one cotyledon or two alternate, not opposite ones.

DIVISION I.—Perianth scarious or herbaceous; sometimes absent.

SUB-DIVISION I.—Seeds albuminous. Plants terrestrial or aquatic.

Orders—*Gramineæ*, *Cyperaceæ*, *Juncaceæ*, *Eriocaulaceæ*, *Typhaceæ*, *Araceæ*.

The orders in this sub-division (see p. 133) are thus distinguished :—*Gramineæ*, by their usually fibrous roots, their round, hollow, prominently jointed stems, and leaves with slit sheaths; *Cyperaceæ*, by their generally creeping roots, angular and solid stems, without prominent joints; *Juncaceæ*, by their round tapering stems, and by their capsular many-seeded fruit. *Eriocaulaceæ*, by their six-eight angular stem and capitate inflorescence; *Typhaceæ*, by their generally stout, solid, erect, tapering stems, and by their densely spiked inflorescence. (In *Sparganium* the fruit is globular.) The remaining order, *Araceæ*, is distinguished by its foliage (dilated in *Arum*), or by the sweet-scented leaves of *Acorus*, the fruit of which is succulent in both the British genera.

ORDER XI.—GRAMINÆÆ, Juss. THE GRASS FAMILY.

Annual or perennial herbaceous plants, with tufted (caespitose), usually fibrous, root, sometimes with creeping roots. Stem simple, rarely branched, hollow, cylindrical, with a usually swollen solid knot at the point where the leaf is inserted on the stem. Leaves often in two rows, linear, with parallel nerves, and a long sheath not united at the edges (slit), rarely only cleft at the top or entire; at the summit of the sheath and at the base of the blade there is generally a membranous appendage (ligule)—a projecting process. The flowers are in panicles, clusters, or spikes, or in little spikes (spikelets), either perfect or imperfect (see § 22); the spikelets are arranged either in apparent or real spikes, or in simple or branched panicles, with usually two bracts at the base (glumes). Florets perfect or unisexual (see § 22), solitary or in pairs, or several, alternately arranged on a common peduncle, constituting a one- or two- or many-flowered spikelet, subtended, as above said, by two external bracts, opposite to the inner and fertile bracts of the lowermost floret, if the spikelet contain more than one. Besides the outer and inner bracts there are sometimes found two or three small membranous or fleshy scales at the base of, and enclosed by, the inner bracts. Stamens three, rarely more or fewer; anthers two-lobed, attached to the filament by the back (dorsal attachment). The lobes of the anther are slightly divergent at both extremities. Ovary free (see § 32, pp. 26, 27). Styles two, elongated, or sometimes none, free or united at the base. Stigmas two, rarely one or three, feathery or with simple or branching hairs. Fruit dry, one-seeded, not opening (indehiscent), either free or united with the inner bracts. Pericarp membranous, united to the seed (adnate). Albumen farinaceous, copious. Embryo situated laterally at the exterior part of the albumen.

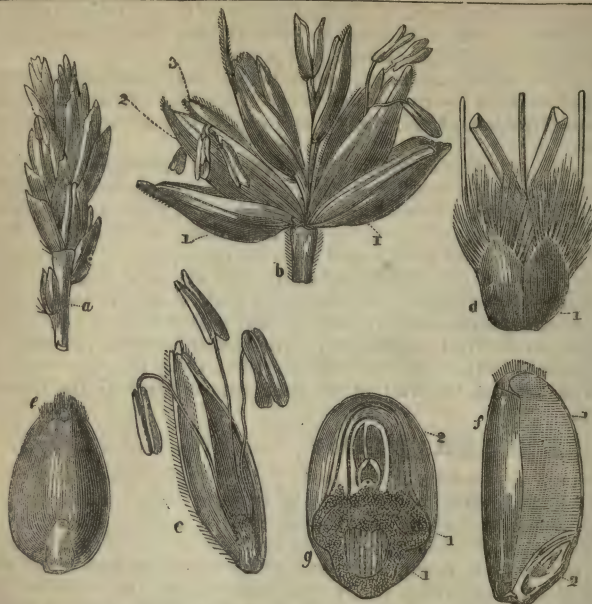


Fig. 113.—The cut represents *Triticum sativum* (Winter-wheat). *a*, a portion of the spike; *b*, a detached spikelet; *c*, a floret, with filaments and anther; *d* 1, the membranous internal scales (glumellules); *e*, the fruit with its external embryo; *f*, a section of the fruit; 1, the farinaceous albumen; 2, the embryo; *g*, a longitudinal section of the embryo; 1, the lower radicle; 1, the secondary radicles; 2, the cotyledon and plumule; *b* 1 are the glumes; *b* 2, the lower glumelle; *b* 3, the upper glumelle. All except *a* more or less magnified.

Note.—In the following description of the genera and species of this order the term *glume* is the equivalent of *calyx*, employed by Smith. *Glumelle* signifies the corolla of the same author, and the *pale* (palea) of other more recent authors. *Glumellule* is the nectary of Smith, and the *lodicule*, *paleola*, and *squamula* (scale) of others. Lower and upper glumes and glumelles are employed instead of outer and inner, as more precise and scientific. Fruit is used for caryopse, and stem is invariably put for what is often called *culm*; this is done with the view of avoiding unnecessary technicalities. *Spicate* means, like a spike. *Axis* or *rach* is the common peduncle (foot-stalk) of the spikelets or of the florets, and in panicle Grasses is either the primary or upright axis, or the secondary or lateral ones. Compare Coss and Germ., “*Flore des Environs de Paris*,” vol. ii., p. 645.

SYNOPSIS OF THE TRIBES.

Tribe I.—*Panicææ*. The Panic Tribe. Panicle either digitate or branched; spikelets containing one perfect floret and a rudimentary or barren one.

Tribe II.—*Phalarideæ*. The Phalaris Tribe. Panicle either compact and spike-like (dense), or rarely branching or digitate; spikelets compressed, one-flowered, or one-flowered with a rudimentary or barren floret.

Tribe III.—*Agrostideæ*. The Agrostis Tribe. Panicle usually open and spreading; spikelets laterally compressed, containing one perfect floret, and one or more rudimentary or barren ones.

Sub-Tribe I.—*Agrostideæ veræ*. True Agrostides. Spikelets compressed; glumelles membranous or scarious; fruit loose in the glumelles.

Sub-Tribe II.—*Stipeæ*. The Stipa Sub-tribe. Spikelets cylindrical; fruit not loose in the glumelles.

Sub-Tribe III.—*Milieæ*. Spikelets slightly dorsally compressed; fruit closely invested with the indurated glumelles.

Tribe IV.—*Aveneæ*. The Oat Grass Tribe. Panicle branching, open, rarely clustered or spike-like; spikelets containing two or several perfect florets.

Sub-Tribe I.—*Sesslerieæ*. The Moor Grass Tribe. Stigmas reaching to the summit of the glumelles.

Sub-Tribe II.—*Aveneæ veræ*. Stigmas feathery, not reaching beyond the base of the glumelles.

Tribe V.—*Festuceæ*. The Festuca Tribe. Panicle usually branched and spreading; spikelets peduncled (rarely sessile), containing two or several florets.

Tribe VI.—*Triticeæ*. The Triticum Tribe. Spikelets one or many-flowered in a spike.

Sub-Tribe I.—*Triticeæ veræ*. The True Wheat Grasses. Glumes two, or the upper one rarely absent; stigmas feathery, adjacent to the base of the glumelles.

Sub-Tribe II.—*Nardeæ*. The Nard Sub-tribe. Glumes absent.

TRIBE. I.—**PANICEÆ**. THE PANIC TRIBE. Spikelets arranged in a spicate or spike-like panicle, either digitate or branched, sometimes in a spicate cluster (raceme), compressed at the back (dorsally compressed), containing one perfect floret, with a rudimentary one in the form of one or two scales or a third glumelle. Lower glume smaller than the upper, often very short, and applied to the flat face of the spikelet. Styles long. Stigmas extending above the summit of the glumelles.

Genera.—*Digitaria*, *Panicum*, *Setaria*.

SYNOPSIS OF THE GENERA.

Digitaria. Rach (common peduncle) flattened; spikelets in pairs; the one nearly sessile, the other pedicelled, arranged in one-sided (unilateral) linear spikes which are contiguous, and in a simply digitate panicle. (See Index).

Panicum (*Echinochloa*). Spikelets alternate; spikes alternate, the uppermost forming a terminal cluster, *not subtended by a bristly involucre*; upper-glume strongly ribbed and awned.

Setaria. Spikelets subtended by an involucre, which consists of rough or toothed bristles, arranged in a spike-like, often interrupted panicle.

I. **Digitaria**, Scop. Finger Grass. Florets in a simple, digitate panicle. Spikelets one-flowered, with an abortive floret, or a floret reduced to a single glumelle, which is like a third glumelle to the fertile floret, arranged on one side of a flat axis (rach), usually in pairs; one nearly sessile, the other pedicelled, contiguous at the summit. Lower glume small or none, the upper convex, not awned, often shorter than the glumelle. Glumelles coriaceous, the lower

embracing the upper. Stigmas short, feathery. Fruit oblong, convex on both sides.

1. **D. sanguinalis**, Scop. Hairy Finger Grass. E. B. 849, L. C. Excluded species. Root fibrous, annual, stems prostrate at the base, *ascending*, often branching. Leaves short, flat, often reddish, more or less hairy, as well as the sheaths, with a short ligule. Spikes three-six, *erect or slightly divergent*. Spikelets oblong lanceolate; one nearly sessile, the other pedicelled, often violet-coloured. Lower glume minute, glumelles lanceolate, with prominent ribs. Found rarely in cultivated ground, but not indigenous. Annual. August.

2. **D. humifusa**, Pers. Glabrous Finger Grass. E. B. 2613, L. C. 1265. Stems *prostrate, spreading*, very unequal, usually six-twelve inches long, branching from the base. Leaves spreading, short, flat, acuminate, glabrous, as are also the sheaths. Spikes, three or more, alternate, or springing from the same point of the stem, *spreading*. Spikelets in pairs, one nearly sessile, the other pedicelled. Glumes elliptical, downy, with glabrous nerves. Glumelles broader and shorter than in *D. sanguinalis*. A rare annual, on bare sandy places. In gardens, and cultivated patches, on the common near Weybridge, Surrey. Annual. August.

A. 3, C. 4. Lat. 50°—53°. Alt. 0—50. T. 51°—49°.

II. **Panicum**, Linn. in part. Panic Grass. Spikelets one-flowered, with an imperfect floret, in alternate spikes, the uppermost approaching, in exotic species sometimes panicle. Lower glume of the barren floret small, upper one large, strongly nerved, awned, ciliate; glumelles almost equal, the lower acuminate, embracing the higher. Ovary glabrous. Styles two. Stigmas feathery. Fruit oblong, convex, loosely invested by the glumelles.

P. crus-galli, Linn. Cock's-foot Grass. E. B. 876, L. C. 1266. Stems several from the same root, stout, angular, somewhat compressed, flexuous with many joints, three-four feet high, leafy. Leaves broad, keeled, with prominent nerves, often with a white stripe, tapering, without a ligule. Panicle large, spreading on a triangular rach. Spikes alternate or opposite, or three together. Spikelets one-two flowered, contiguous (one floret is barren), arranged on the under side of the spikes, which are inclined to one side. Glumes ciliated and hispid, with rather elongate, rough awns. On rich, moist, arable land; rare. Battersea Fields. Annual. July—October. There are two sub-varieties of this species, viz., *α*. scarcely awned, *β*. with long awns.

III. **Setaria**, Palis. de Beauv. Bristle Grass. Spikelets surrounded with a bristly involucre, arranged in a spicate (spike-like), often interrupted panicle, one-flowered, with an inferior barren floret, which is reduced to two very unequal glumelles, or only one. Lower glume very small or none, upper one equal to the glumelles, convex and not awned; glumelles leathery, equal, glabrous, becoming horny. Stigmas feathery. Fruit flat on one side, convex on the other, enclosed by the glumelles.

1. *S. viridis*, P. de Beauv. Green Bristle Grass. E. B. 875, L. C. 1267. Stems solitary or several, unequal, erect or procumbent, a foot high, sometimes branching at the base. Leaves acuminate, variable in width, rough at the edges. Panicle spicate (spike-like), compact, oblong-ovate or cylindrical. Bristles of the involucre often reddish, elongated, exceeding the spikelet, furnished with teeth pointing upwards. Glumelles of the fertile floret almost smooth. On sandy, cultivated fields. Annual. July—September.

A. 2, C. 4. Lat. 51° — 53° . Alt. 0—50 yards. T. 50° — 49° .

This plant has been seen in abundance in a sandy, cultivated field near Postford, in the parish of Albury, by Mr. Salmon, and in the parish of Puttenham, by Mr. Spicer. *I saw it in the first mentioned locality.*

2. *S. verticillata*, Beauv. Rough Bristle Grass. E. B. 874, L. C. 1268. Stems more or less numerous, usually branching at the base. Leaves flat, acuminate, rough at the margin, larger than in *S. viridis*, and rougher. Panicle spicate, compact, generally interrupted at the base. Bristles not so long as in *S. viridis*, with minute teeth pointing downwards. Glumelles of the fertile floret almost smooth. Cultivated places, way-sides, villages, &c. Not native. Annual, July—September.

3. *S. glauca*, Beauv. Glaucous Bristle Grass. Host. Gram., ii., tab. 16. Stems more or less numerous, erect or spreading, sometimes branching at the base. Leaves as in the preceding species. Panicle spicate, compact, oblong-ovate or cylindrical. Bristles of the involucre, usually much longer than the spikelets, with teeth pointed upwards. Glumelles of the fertile florets wrinkled transversely. Sandy fields and fallows. First discovered at Weybridge, Surrey, by Mr. Borrer. Battersea Fields. Annual, July—September. Not indigenous.

4. *S. italica*? P. B. Italian Bristle Grass. Panicle spicate (spike-like), very large, consisting of densely flowered lobed branches, the whole arched or somewhat bent, the axis hairy or woolly, teeth of the bristles pointing upwards. In Battersea Fields, with all the above except *S. verticillata*.

Has *S. verticillata* been recently seen in these fields?

TRIBE II.—**Phalarideæ**. THE PHALARIS TRIBE. Spikelets either pedicelled or almost sessile, in a spicate (spike-like), lax, or compact panicle, rarely in a branching or digitate panicle, sometimes in a filiform or cylindrical spike, compressed laterally, containing either one solitary fertile floret, or a fertile floret, with either a barren floret or a floret reduced to one or two scales (glumelles). Style long. Stigmas reaching the apex of the glumelles, rarely exceeding them (generally surpassing the glumelles).

Genera.—*Phalaris*, *Anthoxanthum*, *Hierochloe*, *Phleum*, *Alopecurus*, *Knappia*, *Cynodon*, *Spartina*, *Leersia*.

SYNOPSIS OF THE GENERA.

Phalaris. Glumes nearly equal, membranous, keeled, longer than the glumelles, spikelets in a close (spike-like) or branched panicle.

Anthoxanthum. Glumes unequal, scarious. Stamens two. Spikelets in a dense panicle.

Hierochloe. Glumes two, nearly equal, bearing three florets, the two lateral barren (bearing only stamens), the central one perfect.

Phleum. Glumes equal, keeled, spikelets containing one fertile floret only.

Alopecurus. Panicle dense (spike-like), usually cylindrical. Glumes equal, keeled, mostly combined at the base, containing one perfect floret; glumelle compressed, with a twisted and reflexed awn.

Knappia. Sm. (*Mibora*, Adans.) Spikelets unilateral, nearly sessile, arranged on a filiform spike. Glumes scarcely keeled; glumelles two, the lower without an awn.

Cynodon. Rich. Spikelets in a filiform spike, contiguous at the apex. Panicle simple, digitate (the spikes compose a simple digitate panicle).

Spartina. Spikelets upright, in a spike, single-flowered. Glumes unequal; glumelles unequal, outer ones boat-shaped. In these Grasses the spikelets compose linear, erect, terminal spikes.

Leersia. Soland. Spikelets panicked, one-flowered. Glumelles keeled and awned; glumes absent. (?)

IV. *Phalaris*, Linn. Canary Grass. Spikelets one-flowered, in a compact spicate panicle or in a lax branching one with one or two barren florets reduced to lanceolate, ciliated scales. Glumes nearly equal, keeled; glumelles boat-shaped, keeled, coriaceous, the lower one is larger than the upper, not awned. Stigmas feathery. Fruit oblong, more or less compressed, compactly enclosed by the glumelles (closely invested by the glumelles).

1. ***P. arundinacea*, Linn.** Reed Canary Grass. E. B. 402, L. C. 1269. *Root creeping, perennial.* Stem tall, erect. Leaves long and broad, flat, scabrous at the margin; ligule large, blunt. Panicle rather lax with spreading branches, elongated, greenish-white with a tinge of violet. Glumes not winged at the keel; glumelles shining. Common on the banks of rivers, ponds, &c. Perennial. June, July.

A. 18, C. 81. L. 50°—61°. Alt. 0—300 yards. T. 52°—44°.

Var. β . Striped leaved Canary Grass is not uncommon in gardens, but is rarely met with except as an outcast from pleasure grounds, &c.

2. ***P. canariensis*, Linn.** Canary Grass. E. B. 1310, L. C. 1270. *Root fibrous, annual.* Stems about eighteen inches long, leafy, striated, rough. Leaves flat, acuminate, with a longish, blunt ligule. Panicle spicate, compact, ovate. Glumes shortly acuminate, with two prominent nerves and scarious wings, variegated with green lines; glumelles downy. Fruit smooth, glossy. In cultivated fields in many places; imperfectly naturalised in the south of England. Annual. June—August. Alien.

3. ***P. paradoxa*, Linn.** Sibth., Fl. Gr., 58. Reh., Fl. Ger., i. 52. Root fibrous, annual. Stems tufted, branching at the base, erect, leafy, striated, with prominent knots. Leaves lanceolate, about as long as the sheaths, which are enlarged above, auricled, with large ligules. The spike-like clusters of flowers are ovate-cylindrical. The glumes are striped with green like *P. canariensis*. It may, however, be distinguished from the latter, by its usually longer and more cylindrical

spikes. At Wandsworth, near steam-boat pier. Swanage, Dorsetshire. Mr. James Hussey. Annual. July—October.

V. Anthoxanthum, Linn. Vernal Grass. Spikelets arranged in a spicate panicle, one-flowered, with two lower, barren florets, each reduced to a glumelle which is longer than the fertile glumelle, notched at the apex and furnished with a dorsally attached, twisted awn. Glumes two, keeled, the lower one-nerved, the upper three-nerved, twice as long as the lower one. Glumelles membranous, boat-shaped, equal, not awned; barren glumelles longer than the fertile, notched at the summit, with a twisted dorsal awn. Stamens two. Stigmas filiform, feathery. Fruit oblong, slightly compressed, closely invested by the glumelles.

A. odoratum, Linn. Sweet-scented Vernal Grass. E. B. 647, L. C. 1271. Root tufted. Stems erect, numerous, growing in a tuft. (somewhat hassocky), aromatic when dry, and even when green, if a handful be bruised or twisted. Leaves flat, more or less rough, with an oblong ligule. Panicle oblong, slightly compact. Meadows, pastures, and other grassy places. Perennial. May—June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1150 yards. T. 52°—35°.

VI. Hierochloe, Gmel. Holy Grass. Spikelets in a branching panicle, with one perfect floret and two bearing stamens only. Glumes slightly unequal, membranous, about as long as the florets; glumelles unequal, membranous, neither becoming horny nor coriaceous, the upper pair bearing a perfect floret with two stamens, the lower pair bearing three stamens each, without a pistil. Stigmas feathery, rather longer than the glumelles. Fruit ovate, loose in the glumelles.

H. borealis, Roem. and Schultes. Northern Holy Grass. E. B. 2641, L. C. p. 16. Root creeping, stems erect, leafy, twelve-eighteen inches high. Leaves broad, flat, with long sheaths, rough at the margin; ligule short, rather acute. Panicle erect; branches spreading, slender; spikelets purplish, florets not awned. Perennial. July. Said to have been found by Mr. G. Don, in Glenkella ("Glen Cally"), near the Spittal of Glenshee, in Forfarshire. Recently (1854) rediscovered as a British plant by Mr. R. Dick, near Thurso, in Caithness.

VII.—Phleum, Linn. Timothy Grass. Spikelets in a spicate panicle, or in a cylindrical spike, one-flowered, without rudimentary lower florets, but sometimes with a pedicelled rudimentary superior one. Glumes equal, or nearly so, longer than the glumelles, acuminate or truncate-acuminate. Lower glumelle truncate or mucronate, rarely with a terminal awn; upper one two-keeled. Stigmas feathery. Fruit oblong, slightly compressed, loose in the glumelles.

1. **Ph. pratense**, Linn. Meadow Timothy Grass. E. B. 1076, L. C. 1273. Root tufted, sometimes creeping or tuberous, often bearing tufts of barren leaves (abortive stems?). Stems leafy, except at the top, erect, in some varieties decumbent. Variable in height from

a few inches to a yard. Leaves variable in length, more or less rough, the upper leaves with a very long sheath. Spike (clustered panicle) cylindrical, of various lengths, with nearly sessile spikelets. *Glumes truncate, bearing an awn generally shorter than the glume*, with ciliated keels. No rudimentary floret. Meadows, pastures, and grassy places. Perennial. June, July.

Var. *β. bulbosum*. Stem at the base changed into a fleshy single or double bulb-like swelling.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

Note.—This Grass is commonly cultivated in America, both as a fodder and a pasture plant. It is only partially cultivated in this country. On the Marquis of Breadalbane's farm, or on one of his farms in Glen Goldie, near Taymuth, we saw some heavy crops of this Grass in 1856, and the steward informed us that the hay made from it was better relished by the cattle than that made from Ray-grass, *Lolium perenne*, the commonly cultivated fodder-grass of Britain.

2. **Ph. Boehmeri**, Wibel. Purple-stalked Timothy Grass. E. B. 459, L. C. 1276. Root fibrous, usually with many tufted leaves. Stem erect or ascending, leafy nearly to the summit, rough, of a purplish hue where naked, twelve-eighteen inches high. Leaves of variable length, serrated at the margin, with minute and very sharp teeth, the limb of the upper leaf short, with a very long sheath, which is slightly inflated. Panicle spicate, cylindrical, tapering at the top, with numerous spikelets on each branch. *Glumes acuminate*, scabrous or ciliated on the keel. Fertile floret not accompanied with the rudiment of a barren one. Meadows and pastures. Perennial. June, July.

A. 2, C. 4. Lat. 51°—53°. Alt. 0—50 yards. T. 49°.

3. **Ph. Michelii**, All. Michelian Timothy Grass. E. B. 2265, L. C. p. 16. Root fibrous. Stems tufted, leafy, one-two feet high, with barren shoots. Leaves flat, pointed; the upper ones with slightly swelling sheaths. Panicle close, variable in length, one-three inches. *Glumes lanceolate with sharp, rigid points*, and strongly-fringed keels. Glumelles similar to the glumes, outer one five-ribbed, inner cleft. Scotland. (?) Said to have been found on the Clova mountains by Mr. G. Don. Perennial. July.

4. **Ph. arenarium**, Linn. Sea Timothy Grass. E. B. 222, L. C. 1274. Root tufted, with downy fibres. Stems several, erect, six-twelve inches long, leafy below, naked and purplish above. Leaves very short, sheaths long and swelling; stipules lanceolate. *Panicle closely spicate, cylindrical*, consisting of several-flowered peduncles, tapering at both ends. *Glumes strongly ribbed*, notched and mucronate on both sides of the notch, and strongly ciliated above. Glumelles membranous, not half so large as the glumes, truncate, ribbed, crenate or notched. On sandy sea-shores. Annual. June.

A. 13, C. 30. Lat. 50°—58°. Alt. 0? T. 52—47.

5. **Ph. asperum**, Jacq. Rough Timothy Grass. E. B. 1077. Root strong, whorled fibres. Stem leafy, branched, smooth, a foot

high, more or less. Leaves pointed, erect, with slightly swelling sheaths. Panicles erect, solitary and terminal, very dense, round or tapering, much branched, though apparently a close spike. *Glumes tumid, rough, rhomboid, with a small rigid point. Glumelles unequal, oval, ribbed, slightly downy. In dry open fields; rare. Annual. July.*

A. 2, C. 3. Lat. 51°—53°. Alt. 0—50 yards. T. 49°.

6. **Ph. alpinum**, Sm. *Ph. commutatum*, Gaud. Alpine Timothy Grass. E. B. 519, L. C. 1272. Root creeping, tuberous.* Stem thin, erect, bent, and sometimes branching at the base, smooth, striated, six-twelve inches high. Leaves rather broad, with very long inflated sheaths, and short acute ligules. Panicle dense, ovate-oblong, ovate, or cylindrical. *Glumes truncate, strongly ciliated at the keel, with strong fringed bristles and long awns. Outer glumelles ribbed, and terminated by a small awn. In lofty wet moors in Scotland. Perennial. July.*

A. 2, C. 4. Lat. 56°—58°. Alt. 700—1200 yards. T. 40°—34°.

VIII. **Alopecurus**, Linn. Fox-tail Grass. Spikelets in a spicate compact panicle, one-flowered, without the rudiments of barren florets. Glumes equal, boat-shaped, combined at the base. Glumelle solitary, compressed into a sort of utricle by the union of the margins below, bearing a dorsal-twisted awn. Upper glumelle absent. Styles combined. Stigmas feathery or hairy. Fruit oblong, compressed, smooth, loose in the glumelles.

1. **A. pratensis**, Linn. Meadow Fox-tail Grass. E. B. 759, L. C. 1278. Root tufted, slightly creeping, with short, oblique rhizomes (see Index). Stems erect, rather tall. Leaves flat, upper ones short, with long, slightly inflated, furrowed sheaths, and with short blunt ligules. Panicle spicate, cylindrical, obtuse, soft, *with a silky, hoary aspect*, the branches or clusters bearing five-six spikelets. *Glumes acute, downy, ciliated, combined below, united for one-third of their length from the base upwards. Glumelles solitary, one glumelle is absent, with five ribs, and dorsal twisted awns, awn projecting about half the length of the floret, rarely without awns. In meadows and pastures. A valuable Grass, being early and leafy. Perennial. May—July.*

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—43°.

Var. *β. muticus*. Awns almost or quite absent.

2. **A. alpinus**. Sm. Alpine Fox-tail Grass. E. B. 1126, L. C. 1277. Root creeping, somewhat tubercular (the swollen joints of the underground stem?). Stem bent at the lower joint, then erect, leafy, smooth, striated. Root-leaves narrow; stem-leaves broad, short, smooth, striated, with very long striated, smooth sheaths, with a very short ligule. Panicle *dense, ovate, elongate, formed of numerous, tufts or clusters. Glumes three-ribbed, shaggy or downy, with long,*

* In the description of the Grasses, when the character of the root is omitted, fibrous is to be understood. The normal condition of the root in this order is fibrous.

dense, soft white hairs. Glumelles keeled and ribbed, with rough dorsal awns, *scarcely longer than the floret*. Stigmas feathery. On lofty mountains, in Scotland. Perennial. July.

A. 2, C. 5. Lat. 56° — 58° . Alt. 700—1200 yards. T. 40° — 34° .

3. **A. agrestis**, Linn. Slender Foxtail Grass. E. B. 848, L. C. 1282. Root fibrous, annual. Stems several, one or two feet high, erect, or ascending, a little rough near the summit. Leaves rough, with long swelling sheaths. Spike (panicle) *cylindrical, lax, elongated*, tapering at each end, *glabrous or nearly so*. Spikelets solitary or in pairs, on short branches. Glumes *united in the lower half*, either with fine pubescence or quite smooth. Glumelle with an *awn much extended beyond the glumes*. In corn-fields, fallows, &c. A troublesome weed. Annual. May—August.

A. 12, C. 50. Lat. 50° — 56° . Alt. 0—200 yards. T. 51° — 48° .

4. **A. geniculatus**, Linn. Floating Foxtail Grass. E. B. 1250, L. C. 1279. Root consisting of several long fibres. Stem reclining at the base and rooting at the joints, sometimes floating, with more or less angular bends at the joints, but not quite zigzag, often branching at the base. Leaves broad, acuminate, furrowed, rough, with long smooth, rather swollen sheaths. Panicle spicate, cylindrical, obtuse. Glumes pubescent (downy), ciliate, *blunt*, combined at the *base only*. Glumelles slightly ribbed, awned from the middle, or a little above the base. In ponds, ditches, &c. May—August.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—400 yards. T. 52° — 43° .

5. **A. fulvus**, Sm. Stem similar to that of the preceding, chiefly distinguished from *A. geniculatus* by the *paler spikes*, the blunter glumes, broader anthers, and by the shorter awn arising from the middle, and not from the base of the glumelle, and by the orange-coloured anthers. In the same habitats as *A. geniculatus*, but more restricted in its range. In flower at the same period.

A. 5, C. 12. Lat. 50° — 54° . Alt. 0—200 yards. T. 51° — 48° .

6. **A. bulbosus**, Linn. Bulbous Foxtail Grass. E. B. 1249, L. C. 1281. Root fibrous, tufted, sometimes *bearing little tubers or bulbs*. Stems reclining at the base, erect, slender, leafy. Leaves narrow, channelled, scarcely flat, short, with long, slightly swelling sheaths. Panicle spicate, close, cylindrical, acuminate. Glumes *distinct*, somewhat dilated upwards, longer than the glumelles. Glumelles truncate, notched with a tooth in the centre. In meadows and marshes near the sea. Perennial. June, July.

A. 7, C. 11. Lat. 50° — 55° . Alt. 0. T. 51° — 49° .

Chiefly in the south of England. A bulbous rooted variety of *A. pratensis* was collected many years ago near Mersea Island, Essex, with distinct glumes. (?) We think we have examined forms of *A. pratensis* in which the glumes were nearly distinct. The coherence of parts is liable to variation, and the roots of several Grasses have a tendency to become bulbous.

Query.—Is this species or form really distinct from *A. pratensis*?

Crypsis aculeata, Ait., or *schoenoides*, Lam. Rehl., Fl. Ger., i. 48

Stems procumbent diffuse, spreading in all directions six-twelve inches long, slender, with swollen joints, much branched, leafy. Leaves flat, tapering from their base, and ending in a blunt cartilaginous point, with a short sheath, which is topped by a cartilaginous, hairy constriction (ligule), hairy on the under side. Spike almost globular, sessile, surrounded by the enlarged sheath of the upper leaf. Battersea Fields, 15th August, 1856.

IX. Knappia, Sm. *Knappia*. Spikelets in a filiform spike, nearly sessile, alternate, or almost on one side (unilateral), one-flowered, without rudimentary barren florets. Glumes *scarcely keeled, rounded-truncate*, unequal. Glumelles almost equal, *ciliate*, scarious, ribbed, hairy, fringed, rather shorter than the glumes, the lower glumelle broad, five-nerved, infolding the higher one. Stigmas slightly hairy. Fruit oblong, compressed, loose in the glumelles.

K. agrostidea, Sm. Early *Knappia*. E. B. 1127, L. C. 1283. Roots fibrous, tufted. Stems numerous, capillary (hair-like), leafy only at the base. Leaves short, narrow, channelled, blunt. Spike filiform, erect, consisting of five-ten alternate or one-sided, sessile or nearly sessile, cylindrical one-flowered, purplish spikelets. Common peduncle zigzag, angular but not excavated. Upper glume opposite to the axis of the spike. Not uncommon in Wales, and especially in Anglesea. Said to have been found in Essex, near Southend. As it is common in France, it probably occurs on our southern shores, and may have been overlooked, as it is a Grass of small size, is very early, and disappears soon after shedding its seeds. Its period of flowering is said to be from March to May. Annual.

A. 1, C. 1 (Anglesea). Lat. 51°—52°. Alt. 0. T. 49°.

X. Cynodon, Rich. Dog's-tooth Grass. Spikelets in filiform, digitate spikes, nearly sessile, on the outside of the axis (rach), one-flowered, with a superior rudimentary floret, reduced to a subulate pedicel. Glumes keeled, slightly unequal, not awned, shorter than the glumelles. Lower glumelle compressed, keeled, with or without a sharp point; the upper one two-keeled or ribbed. Stigmas feathery, of the glumelles. Fruit compressed, loose,

XI. *Spartina*, Schreb. Cord Grass. Herbage rigid, smooth. Spikelets in a long, simple or compound spike, on one side, one-flowered. Glumes unequal. Glumelles unequal, long, lanceolate, obtuse, without awns; lower glumelle boat-shaped, compressed, blunt. Filaments not so long as the glumelles; anthers erect, entire at the ends. Stigmas feathery, projecting at the tip of the florets. Fruit oblong, compressed, quite loose.

1. ***S. stricta*, Roth.** Twin-spiked Cord Grass. E. B. 389, L. C. 1262. Root creeping, with strong fibres. Herbage tough and hard. Stem erect or ascending, round, leafy, about a foot high, more or less.† Leaves spreading or sub-erect, smooth, acuminate, hard, and somewhat spiny at the top, channelled, involute when dry. Sheaths numerous, long, investing each other, spongy. Spikes *two*, closely pressed together. Spikelets imbricated. Lower glume narrow, acute, higher one longer and broader, both more or less hairy, the higher usually with a keel, ciliated above. Fruit lanceolate. Muddy shores of tidal rivers. Perennial. August. (?)

A. 5, C. 8. Lat. 50°—54°. Alt. 0. T. 52°—49°.

2. ***S. alterniflora*, Loisel.** Alternate-flowered Cord Grass. E. B. 2812, L. C. 1263. Stem about two feet high, more or less, upright, leafy. Leaves flat, broad, tapering, sharp-pointed, mostly exceeding the stem in length. *Spikes several*, alternate or lateral, bearing *alternate*, one-flowered spikelets. Glumes *not rough and ciliated as in S. stricta*. Muddy places on the southern coasts. Perennial. August. (?) Only known in one locality, viz., Itchin Water, Southampton. We have seen it in large masses a long way down Southampton Water, towards, and not far from, Netley Abbey. Alien?

XII. *Leersia*, Soland. Spikelets paniced, one-flowered. Glumes absent in the British species. Glumelles compressed, keeled, not awned, the lower one broader than the upper, membranous, strongly ribbed and ciliated. Stigmas not reaching to the middle of the glumelle, protruding at the side of the floret. Fruit?

***L. oryzoides*, Soland.** *Leersia*. E. B. 2908, L. C. 1262*. Stem more or less erect, smooth, striated, leafy, entirely covered by the leaf-sheaths. Leaves broad, more or less spreading, with very rough nerves and serrated margins, their length much exceeding the stem and panicle. Panicle only partially developed, part or most of it inclosed in the sheath, often all of it. Spikelets pellucid, on capillary, much-branched pedicels. A recent addition to the English Flora. First discovered by Mr. Borrer, in ditches near or at Henfield, Sussex; more recently found in Surrey, near Reigate, &c. Perennial. September.

A. 2, C. 4. Lat. 50°—52°. Alt. 0—50 yards. T. 51°—49.

† Said by Smith and Babington to be from one-two feet high, but we have never seen specimens quite so tall as either of these dimensions. Specimens from Yarmouth, Isle of Wight, were deemed luxuriant; and are so when compared with those from Sheppey, but they barely average more than from six-twelve inches.

TRIBE III.—**Agrostideæ**. THE AGROSTIS TRIBE. Spikelets in a branching panicle, rarely in a spicate panicle, racemose or clustered, more or less laterally compressed, rarely almost cylindrical, containing a single fertile floret, sometimes accompanied by one or more barren, rudimentary florets. Stigmas sessile, or on very short styles, reaching only to the lower or middle portion of the glumelles.

SUB-TRIBE I.—**Agrostideæ veræ**. True Agrostides. Spikelets laterally compressed. Glumelles membranous or scarious, the lower with or without an awn. Stigmas reaching to the lower portion of the glumelle. Fruit loose.

SYNOPSIS OF THE GENERA.

Agrostis. Spikelets laterally compressed. Glumes keeled without awns; glumelles with short hairs at the base. Fruit loose.

Calamagrostis. Florets surrounded by long basal hairs, which exceed the glumelles in length.

Ammophila. Florets surrounded by basal hairs, which are shorter than the glumelles.

Arrhenatherum. The perfect floret of the one-flowered spikelet accompanied by a lower barren floret.

Holcus. The upper floret of the spikelet barren (with stamens only).

Lagurus. Florets in spicate ovate, dense and very woolly panicles.

Polypogon. Both the glumes awned. Lower glumelle awned.

Melica. One floret, rarely two perfect florets in each spikelet, with one, or several barren rudimentary ones. Glumelles without hairs at their base.

XIII. **Agrostis**, Linn. Bent Grass. Spikelets one-flowered, with an upper rudimentary one, in branching panicles; branches more or less spreading and whorled. Glumes keeled, almost equal, or the upper one the longer, not awned. Glumelles with a tuft of short hairs at their base, the lower with or without an awn; the upper glumelle two-ribbed, sometimes very minute or absent. Glumellules (scales investing, or close to, the ovary) two, sometimes united, entire, or nearly so. Stigmas nearly sessile, feathery. Fruit loose in the unaltered glumelle.

Note.—This organ is sometimes indurated when mature.

SECT. I.—Glumes nearly equal, without a rudimentary or barren floret.*

1. **A. vulgaris**, With. Common Bent Grass. E. B. 1671, L. C. 1291. Root tufted, creeping (bearing underground stems). Stems usually branching at the base, erect or ascending. Leaves flat, spreading, or nearly erect, with long striated sheaths; *ligule short, abrupt*. Panicle branching. Branches *diverging even after flowering*, opposite; scarcely whorled, three or four being generally opposite to one (three or four and one), alternately ranged about half-way up the axis. Spikelets purplish. Glumes nearly equal, the keel of the larger slightly hispid. Glumelles usually without awns. Very

* A rudimentary floret is a floret which is deficient in some of its parts. A barren floret may be perfect, or have one series of fecundating organs, but is sterile, or bears no fruit.

common in pastures, borders of fields, and other grassy places, Perennial. July.

Var. *β. pallescens*. Spikelets greenish-white, often awned.

Var. *γ. pumila*. A dwarfish form, not more than two-four inches long; a very neat plant. Coss. and Germ., 629.

Var. *δ. viviparous*.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—800 yards. T. 52°—39°.

2. **A. alba**, Linn. Marsh Bent Grass. E. B. 1189, L. C. 1292. Stems decumbent and rooting at the base, erect, tall, smooth. Leaves flat, tapering, rough, especially at the margins; sheaths long, mostly smooth; *ligule large, elongate, finally torn*. Panicle *rather close*, with very numerous branches, nearly erect when in fruit, tufted about the joints of the primary (erect) axis; the secondary branches and pedicels are ciliated with sharp teeth, which are directed upwards. Lower glume with a ciliated keel, edges membranous; both acuminate, and exceeding considerably the glumelles.

This is a very variable species; in some of its forms it approaches *A. vulgaris*; but in this state the panicle is not so divergent as in that species, and the branches are rather more numerous. The form described above is from the Orkneys, and appears to be intermediate between the form figured in E. B. as above and the var. *alba*, E. B. 1532, or *A. stolonifera*, the Fiorin Grass of Dr. Richardson. In the latter variety the panicle is more or less close, *with dense tufts of branches at each joint of the common axis*; the branches are often densely covered with spikelets. All the varieties are common in moist meadows, woods, and similar places. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

3. **A. canina**, Linn. Brown Bent Grass. E. B. 1856, L. C. 1290. Root tufted, with trailing, leafy shoots. Stem erect or ascending, not rooting, slender, smooth. Leaves roughish, flat, the radical leaves tufted, involute, and setaceous (hair-like); *ligule elongated, lanceolate, finally torn*. Panicle spreading when in flower, *nearly upright in fruit*. Branches rather rough; spikelets purple; glumes equal, smooth, barely rough on the keel; the lower and the larger *glumelle has a jointed bent or straight awn* inserted about the centre of its keel; upper glume wanting. Common in pastures, especially where the drainage is deficient. Perennial. June. (?)

A. 18, C. 80. Lat. 50°—61°. Alt. 0—200 yards, E. T. 52°—45°.

4. **A. setacea**, Curtis. Bristle-leaved Bent Grass. E. B. 1188, L. C. 1289. Root tufted. Stems above a foot high, reclining at the base, then erect, more or less rough. Leaves rough, stem-leaves short, radical ones tufted, *all more or less involute*, and the root leaves, especially, hair-like. *Panicle closer and more upright than in A. canina*, with angular, rough, branches. Glumes about equal, long and acuminate. Glumelles unequal, lower awned. In the south and south-west of England on turfy heaths. Perennial. July. (?)

A. 3, C. 6. Lat. 50°—52°. Alt. 0—100 yards. T. 52°—49°.

SECT. II.—Lower glume smaller than the upper; the fertile floret is accompanied with an upper or rudimentary barren one.

5. **A. Spica-venti**, Linn. *Apera Spica-venti*, Beauv. Silky Bent Grass. E. B. 951, L. C. 1288. The characters of *Apera* are the same as those of *Agrostis*, except in the inequality of the glumes, and the glumes are not always equal in the other section of the genus; the fertile floret is also accompanied with a rudimentary floret. Root fibrous, branching. Stems erect, eighteen-thirty inches high, much taller in a rich soil. Leaves flat, with an oblong ligule. *Panicle large, with numerous spreading branches.* A very elegant Grass. Not rare in sandy fields in the south of England. Annual. July.

A. 4, C. 10. Lat. 51°—55°. Alt. 0—200 yards. T. 50°—48°.

A. interrupta, Linn. Dense-flowered Silky Bent Grass. E. B. 2951, L. C. 1288*. Root, stem, and leaves, as in the preceding. *Panicle contracted, long, narrow, with half-whorled branches, the lower remote.* Glumes unequal, lanceolate, rough at the keel; lower glumelle cleft with a nearly terminal long, straight awn; upper one smaller; anthers roundish, oval. Sandy fields and pastures about Thetford. Annual. June.

XIV. **Calamagrostis**, Adans. Reed Grass. Spikelets, one-flowered, arranged in a branching panicle, without a rudimentary floret. Glumes furrowed, pointed or subulate, nearly equal. Glumelles unequal, the lower larger and bearded at the summit, surrounded by a tuft of long hairs at the base. Glumellules two, entire. Stigmas sessile, feathery.

1. **C. Epigeios**, Roth. *Arundo Epigeios*, Linn. Wood Reed. E. B. 402, L. C. 1296. Stems tufted at the base, on creeping rhizomes, more or less robust and tall, leafy. Leaves broad, flat, acuminate, very long, scabrous. *Panicle large; branches unequal.* Spikelets violet, rarely green. Glumes lanceolate, ribbed, ending in a long point. Glumelles hardly half as long as the glumes, the lower one with a dorsal awn, *from the middle of the lower glumelle*, both rather shorter than the hairs by which they are surrounded. In moist woods, hedges, fens, &c. Perennial. July, August.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—300 yards. T. 51°—44°.

β., a glaucous variety, is described in the French Floras.

2. **C. lanceolata**, Roth. *A. Calamagrostis*, Linn. and E. B. Purple-flowered Small Reed. E. B. 2159, L. C. 1295. Root fibrous, tufted, scarcely creeping. Stems smooth, leafy, three-four feet high, *not leafy on the upper part.* Leaves narrow. *Panicle slender, erect, loose with unequal branches.* Glumelles about half the length of the glumes, both notched, the lower and larger with a small, nearly terminal awn, *at the top of the lower glumelle*, with hairs at the base. In moist woods, hedges, and fens. Common on the Continent, unfrequent (rare?) in this country. Perennial. July.

A. 9, C. 25. Lat. 50°—55°. Alt. 0—200 yards. T. 50°—47°.

3. **C. stricta**, Schrader. (Nutt.) Small Close Reed Grass. E. B. 2160. *Arundo stricta*, L. C. 1298. Stems two-three feet high. Stem-leaves rather broad; leaves of the barren shoots narrower, rigid and convolute. *Panicle erect, close.* Glumes lanceolate. Lower

glumelle cleft, nearly as long as the upper; awn about as long as the glumelle, *inserted above its middle*. Oakmere, Cheshire. Hooker and Arnott. In bogs. Perennial. June—July.

Note.—*There is a rudimentary floret*, in the spikelets of this species.

A. 1, C. 1. Lat. 53°—54°. Alt. 0. T. 48°.

C. lapponica, Wahl. L. C. 1297. In reference to this form, entered here solely in deference to the authors or compilers of the London Catalogue, always quoted in this work after the citation of E. B., Mr. Babington informs us, "that it has shorter branches to its panicle with a longer and sharper ligule," which the learned author deems insufficient to distinguish it from *C. stricta*. This is doubtless a correct judgment. As we have never seen this plant, which is said to be found in Lough Neagh, Ireland, we are not competent to give any opinion about its distinctness either as a species or as a variety.

XV. *Ammophila*, Host. *Psamma*, Palis de Beauv. Sea Reed. Spikelets one-flowered, in a spicate, or slightly branched, close panicle. Glumes keeled, pointed, nearly equal, scarcely longer than the glumelles. Glumelles nearly equal and almost as long as the glumes, with a small tuft of short hairs at each side of their base, the lower with a short awn attached near the summit (attached just below the apex). Glumelles two, entire, lanceolate, longer than the ovary. Stigmas nearly sessile, feathery. This genus differs in habit from the preceding. The tuft of hairs is small and short; the glumes are not so acuminate, and the glumelles are much larger than those of the preceding genus.

A. arenaria, Link. *Arundo arenaria*, Sm. Sea Reed. E. B. 520. *Ammophila arundinacea*, Host. L. C. 1293. Stems upright in a compact tuft, on long, creeping rhizomes, surrounded at the base by the sheaths of the decayed leaves, striated, not rough. Leaves long, rush-like, narrow, rigid, sharp-pointed, smooth; ligule elongated, cleft with pointed lobes. Panicle spicate, contracted at both ends. Glumes lanceolate, entire (the Fig. in E. B. shows the glume bifid), with sometimes a tooth below the summit of the lower one. Glumelles three times as long as the tuft of hairs at their base. One of the most valuable Grasses for binding the sand of the sea-shore, and for raising banks, whereby the sea is restrained from encroaching upon the land. In a series of years this and similar plants form a natural sea-wall. It abounds in Norfolk and along the eastern shores, associated with *Carex arenaria*, *Elymus arenarius*, and some other creeping plants. Perennial. July.

A. 18, C. 60. Lat. 54°—61°. Alt. 0. T. 52°—45°.

XVI. *Arrhenatherum*, Beauv. Oat-like Grass. Spikelets in a branching panicle, containing a single perfect floret, accompanied with a lower barren one, and an upper rudimentary one reduced to a very slender pedicel. Glumes convex not awned, the upper as long as the glumelles. Lower glumelle of the barren floret convex, bearing a rough, dorsal awn, which is bent (geniculate) and twisted below; the lower glumelle of the perfect floret not awned, or with a very

short one, almost terminal. Glumellules two, lanceolate, entire or toothed. Stigmas sessile, feathery. Fruit channelled on one side.

A. avenaceum, Beauv. *Holcus avenaceus*, Sm. Oat-like Grass. E. B. 813, L. C. 1312. Root fibrous or knotty (the swollen joints of the stem). Stem erect, smooth. Leaves flat, large, rough-edged, with long striated sheaths; ligule short. Spikelets glossy, greenish-white, more rarely violet, on rough, half-whorled branches, mostly unilateral. The bulbous variety is not uncommon in dry uplands. In pastures, hedges, fields, roadsides; frequent. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0.—450 yards. T. 52°—42°.

Var. *β. bulbosum*. Base of the stem furnished with several fleshy knobs. In dry fields. These bulbs are called Swine's Arnuts in Scotland.

XVII. Holcus, Linn. Soft Grass. Spikelets in a branching panicle, containing a single perfect floret, accompanied *with a superior barren one*. Glumes compressed, keeled, nearly equal, longer than the glumelles. Lower glumelle of the barren floret keeled, bearing a twisted awn attached just below the summit; the lower glumelle of the perfect floret not awned. Glumellules two, entire. Stigmas distant, sessile, feathery. Fruit oblong, compressed, not channelled.

1. **H. lanatus**, Linn. Meadow Soft Grass. E. B. 1169, L. C. 1313. Roots *tufted*. Stems erect, more or less tufted. *Leaves hairy or downy on both sides*; stipules short, blunt. Panicle erect, somewhat spreading, dense. Glumes hoary or downy; glumelles shorter than the glumes. Awn of the barren floret curved. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—500 yards. T. 52°—41°.

2. **H. mollis**, Linn. Creeping Soft Grass. E. B. 1170, L. C. 1314. Roots *widely creeping*. Stems, tufted, slender, *slightly downy*, rather taller than they are in *H. lanatus*, *with downy knots*. Leaves slightly downy, *with almost smooth sheaths*. Panicle lax. Awns conspicuous, bent and projecting beyond the glumes. Awn of the barren floret much longer than the glume. Sometimes the perfect floret is awned, and the upper one, though rarely, is perfect. Meadows and woods. Perennial. July.

A. 18, C. 80. Lat. 50°—61°. Alt. 0.—350 yards. T. 52°—44°.

XVIII. Lagurus, Linn. Hare's-tail Grass. Spikelets one-flowered in an ovate, close, spicate panicle, without rudimentary or barren florets. Glumes membranous, fringed and awned. Glumelles unequal, lower one convex, terminating in two awns, *with a much longer dorsal one*; upper glumelle involute, cleft, awnless. Glumellule deeply cloven, acute. Filaments short. Stigmas feathery, on very short styles. Fruit oblong, blunt, with a furrow in front.

L. ovatus, Linn. Ovate Hare's-tail Grass. E. B. 1334, L. C. 1306. Root consisting of several hairy or downy fibres. Stem erect, six-twelve inches high, more or less, jointed, leafy, naked at the top, smooth. Leaves short, acute, densely hairy on both sides with long

inflated, ribbed, very downy or hairy sheaths; stipule oblong, embracing the stem, downy or hairy. Panicle ovate, woolly, occasioned by the copious soft hairs of the glumes; the lower florets barren, the upper bristly with the prominent awns of the glumelles. In sandy fields, Channel Islands and South of Europe. In England only as an occasional straggler. Annual. June.

XIX. Polypogon, Desfon. Beard Grass. Spikelets in an erect, compound, dense, partly lobed panicle. Glumes with a prominent toothed or serrated keel, nearly equal, each with a rough, straight, dorsal awn. Glumelles somewhat unequal, much shorter than the glumes, the lower one with a rough terminal awn; the upper two-ribbed and cloven at the summit. Stigmas feathery on short styles. Fruit loose, shining, covered by the glumelles, but not attached to them.

1. **P. monspeliensis**, Desfon. Annual Beard Grass. E. B. 1704, L. C. 1286. Root of several downy fibres. Stems numerous, smooth, one-two feet high, more or less, bent at the lower joints, and somewhat so at the upper. Leaves not long, flat, striated, rough at the ribs and margin, somewhat spreading, with long rather rough sheaths; ligules oblong, cleft, rough at the back. Panicle *dense, lobed, with a silky appearance owing to the long hairs of the glumes*. Glumes linear, notched above the awn, thickly covered with fine short white hairs, and terminated by *long white awns*. In moist pastures near the sea; rare. Woolwich Marshes. Annual. June, July.

A. 3, C. 4. Lat. 50° — 53° . Alt. 0. T. 51° — 49° .

For several years it has grown in some quantity in Battersea Fields, on the mud used for raising the promenade along the river. It will not appear there much longer.

2. **P. littoralis**, Sm. Perennial Beard Grass. E. B. 1106, L. C. 1285. Root creeping. Stems branched and rooting at their base. Leaves keeled, rough, short, spreading, with long sheaths and pointed ligules. Panicle *lax*, with upright branches and long, stalked clusters. Awns *shorter than in P. monspeliensis and straight*. Glumelles notched as well as the glumes; the upper one with a straight awn. In muddy salt marshes; still rarer than the former. Found near the powder magazine, Woolwich, close to the station of the former. Perennial. June, July.

A. 3, C. 4. Lat. 50° — 53° . Alt. 0. T. 51° — 49° .

XX. Melica, Linn. Melic Grass. Spikelets in a cluster or in a racemose panicle, which is lax in the British species, containing one, rarely two, perfect florets, with one or several barren rudimentary florets. Glumes convex, not awned, equal. Glumelles without awns, nearly equal, the lower concave. Glumellules two, free or cohering. Stigmas feathery, on short styles. Fruit oblong, compressed, not furrowed.

1. **M. uniflora**, Retz. Wood Melic Grass. E. B. 1058, L. C. 1317. Root creeping. Stems mostly solitary or few, smooth, slender, leafy, about eighteen inches high. Leaves flat, thin, tapering,

with rough ribs and edges; ligules variable; sheaths nearly or quite smooth, *entire*. Panicle very lax, few-flowered, only the lower branches bearing more than one spikelet. Spikelets erect, elegant, *with only one perfect, sessile floret*; the barren one is on a pedicel. Glumes violet or purplish. Glumelles strongly ribbed, enclosing the fruit, but not attached to it. Woods; common. Perennial. June.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—45°.

2. **M. nutans**, Linn. Mountain Melic Grass. E. B. 1050, L. C. 1318. Root slightly creeping. Stems few or solitary, smooth, leaves flat, not so rough as in the preceding species, with entire sheaths, ligule very short or wanting. Panicle simple, unilateral. Spikelets on short pedicels; glumes brownish, containing *two perfect florets*. Very similar in habit to the preceding, but differs in its closer panicles, also in its simple short branches, and especially in its two-flowered spikelets. Woods in the north of England, and Scotland. Perennial. May, June.

A. 10, C. 25. Lat. 51°—58°. Alt. 0—450 yards. T. 48°—42°.

SUB-TRIBE II.—**Stipeæ**. THE STIPA SUB-TRIBE. Spikelets cylindrical, laterally compressed. Glumelles coriaceous, the lower one terminated by a very long, twisted, often feathery awn. Fruit not loose in the glumelles.

Stipa, Linn. Feather Grass. Spikelets in a narrow, branching panicle, containing one pedicelled floret, without rudimentary or barren ones. Glumes furrowed, acuminate or with long awns, nearly equal. Glumelles coriaceous, the lower one terminated by a long awn, jointed at its insertion, smooth, or ciliated, or feathery. The upper glumelle enclosed by the lower. Glumellules three, fleshy, entire, united at their base with the pedicel of the ovary. Stamens barely projecting beyond the glumelles. Stigmas nearly sessile, feathery. Fruit cylindrical.

S. pennata, Linn. Feather Grass. E. B. 1356, L. C. p. 16. Stems tufted. Leaves narrow, sharp, roughish, with very long sheaths in dense tufts. Panicle simple, erect, with elegant feathery awns, which are about a foot long. Said to have been found in Westmoreland, by Dr. Richardson, in the early part of the last century. Not met with since. Frequently cultivated in gardens. Perennial. June.

SUB-TRIBE III.—**Millieæ**. THE MILLET SUB-TRIBE. Spikelets slightly compressed at the back. Glumelles coriaceous, rarely awned. Stigmas reaching to the middle of the glumelles. Fruit closely invested with the indurated glumelles.

SYNOPSIS OF THE GENERA.

Millium. Panicle very lax and spreading.

Gastridium. Panicle close and erect.

XXI. **Millium**, Linn. Millet Grass. Spikelets one-flowered,

in a spreading panicle. Glumes convex, equal, not awned. Glumelles coriaceous, almost equal, without awns. Glumellules two, fleshy, notched. Stigmas feathery, on short styles. Fruit slightly compressed, oblong, tapering at both ends.

M. effusum, Linn. Spreading Millet Grass. E. B. 1106, L. C. 1287. Root creeping. Stems rather slender, glabrous, erect, leafy. Leaves bright green, broad, flat, with one prominent rib and rough edges; sheaths strongly ribbed and smooth; ligule large, oblong, jagged. Panicle whorled, very large, lax, branching and spreading. Spikelets small. Glumes equal, green. Glumelles pointed, somewhat shining. Woods and moist shady places; common. Perennial. June.

A. 16, C. 60. Lat. 50° — 58° . Alt. 0—400 yards. T. 51° — 44° .

XXII. Gastridium, Beauv. Spikelets in a close, erect panicle, one-flowered. Glumes membranous acute, inflated, and shining at the base; the lower pointed, longer than the upper. Glumelles smaller than the glumes; the lower truncate or obtuse, usually with a dorsal awn; upper one cleft. Glumellules cloven, acute. Fruit closely invested in the glumelles, and enveloped in the glossy glumes.

G. lendigerum, Gaud. *Milium lendigerum*, Sm. Panick Millet Grass. E. B. 1107, L. C. 1284. Stems tufted, decumbent at the base, erect, smooth, leafy. Leaves roughish at the margins, with long striated, slightly inflated sheaths. Panicle erect, close; branches opposite and alternate, simple and compound; secondary branches (branchlets) rough and angular. Glumes shining at the base and tumid. Glumelles much smaller than the glumes, downy with a rough twisted awn, which extends slightly beyond the glumes. Fruit covered by the hardened glumelles; the whole is enclosed in the tumid shining glumes. A maritime Grass. Common on the eastern shores. Annual. August. (?)

A. 6, C. 20. Lat. 50° — 53° . Alt. 0—100 yards. T. 52° — 49° .

TRIBE IV.—Aveneæ. THE OAT GRASS TRIBE. Spikelets pedicelled, rarely almost sessile, in a branching, rarely in a spicate panicle, cluster or spike, containing two or several fertile florets, the upper one often abortive. Glumes large embracing nearly the whole spikelet. Stigmas sessile or on very short styles, not usually reaching above the base of the glumelles.

SUB-TRIBE I.—Sessleriæ. THE MOOR GRASS SUB-TRIBE. Stigmas filiform, reaching to the summit of the glumelles.

Genus.—*Sessleria*.

XXIII. Sessleria, Arduin. Moor Grass. Spikelets laterally compressed, two-three rarely four-six-flowered; in a compact, ovate, or oblong, compressed, rarely cylindrical, spicate panicle. Glumes mucronate or pointed, nearly equal. Lower glumelle keeled, with a mucronate awn, often with three-five mucronate teeth; upper glumelle

doubly keeled, truncate or notched. Glumellules usually two-five-cleft with pointed lobes. Ovary sometimes pubescent at the apex. Stigmas nearly sessile, pubescent. Fruit oblong, a little compressed.

S. cærulea, Ard. Blue Moor Grass. E. B. 1613, L. C. 1299. Root fibrous, creeping, tufted, covered by the decayed sheaths of the former leaves. Stems erect, slender, smooth, leafy only at the base, naked in the greater part of their length, eight-twelve inches high. Leaves narrow, flat, obtuse, mucronate (with a very sharp point), and finely serrated at and near the end; sheaths not long; ligule absent. Panicle erect, bluish grey, shining, ovate, oblong, compressed. Glumes scarious. Upper glumelle flat, cleft. On mountains, north of England, and Scotland. Perennial. April—June.

A. 5, C. 8. Lat. 54°—58°. Alt. 300—900 yards. T. 45°—38.

SUB-TRIBE II.—**Aveneæ veræ**. Stigmas feathery, not reaching beyond the base of the glumelles.

Genera.—*Lagurus* (see p. 207), *Koeleria*, *Danthonia*, *Corynephorus*, *Avena*, *Aira*.

SYNOPSIS OF THE GENERA.

Koeleria. Panicle close, spicate. Spikelets two-five-flowered; *upper floret fertile*.

Danthonia. Panicle open. Spikelets cylindrical, two-six-flowered; *upper floret barren*.

Corynephorus. Panicle branching, spikelets two-flowered. Glumes keeled, equal, *longer than the spikelet*.

Avena. Panicle branching more or less open. Spikelets two-three-flowered, rarely four-five-flowered; the upper floret usually barren or rudimentary. *Glumes as long as the spikelet*. Lower glumelle awned.

Aira. Panicle branching, open. Spikelets two, rarely three-flowered, *often with a rudimentary floret*. Glumes keeled, *longer than the spikelet*.

XXIV. *Koeleria*, Pers. *Aira cristata*, Sm. Crested Hair Grass. Spikelets laterally compressed in a spicate panicle, two-five-flowered, *the upper floret fertile*. Glumes keeled, acuminate, not awned, unequal, the lower one being the smaller. Lower glumelle pointed or terminated by a very short awn, the upper two-ribbed, cleft at the top. Glumellules two, unequal, obliquely truncate or two-three-cleft. Stigmas two, feathery, on very short styles. Fruit oblong, not furrowed.

K. cristata, Pers. Crested Hair Grass. E. B. 648, L. C. 1316. Roots in dense tufts, fibrous, bearing several stems and numerous tufted leaves. Stems erect, slender, smooth, six-twelve inches high, more or less, naked above. Leaves flat, the lower hairy and ciliate at the margin, the upper short and flat, with more or less hairy sheaths. Panicle spicate often interrupted at the base, tapering, somewhat cylindrical, with a silvery, greenish gloss. Spikelets sometimes three-flowered. Pastures chiefly on such as are chalky or calcareous. Perennial. July.

A. 16, C. 70. Lat. 50°—59°. Alt. 0—450 yards. T. 52°—48°.

XXV. *Danthonia*, D. Can. *Triodia decumbens*, Sm. E. Flora. *Poa decumbens*. Spikelets in a clustered or racemose panicle; at first cylindrical, then laterally compressed, two-six-flowered, *the upper floret barren*. Glumes convex, slightly keeled, without awns, nearly equal, as long as, or longer than, the spikelet. Lower glumelle convex, cleft, with short or subulate lobes, furnished with either a long twisted awn or a short point. The upper glumelle two-ribbed, without an awn. Glumellules two, entire or notched. Stigmas feathery on short styles. Fruit ovate, compressed, not furrowed.

D. *decumbens*, D. Can. Decumbent Heath Grass. E. B. 792, L. C. 1315. Root tufted, slightly creeping, usually producing many stems and tufts of leaves. Stems erect, usually leafy to the summit. Leaves flat, nearly erect, with long hairs and hairy sheaths; root-leaves often as long as the stems; ligule a ring of hairs. Panicle consisting of a few turgid large spikelets, clustered, racemose, lax. Spikelet three-four-flowered. Glumes longer than the spikelets. Lower glumelle notched, and furnished with a short point. On spongy mountainous and upland places. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—550 yards. T. 52°—41°.

XXVI. *Corynephorus*, P. de Beauv. *Aira canescens*, Sm. Grey Hair Grass. Spikelets laterally compressed, in a branching panicle, two-flowered, sometimes presenting the rudiment of a third floret. Glumes keeled, not awned, nearly equal, longer than the spikelet. Lower glumelle entire, furnished with a dorsal awn, inserted above the base of the glumelle; the lower part of the awn is twisted, the upper straight and enlarged at the summit, *the middle jointed and surrounded by a whorl of bristles*. Upper glumelle two-ribbed at the base, three-lobed at the summit, not awned. Glumellules two, cleft. Stigmas sessile. Fruit oblong, compressed, invested by the glumelles.

C. *canescens*, Grey or Hoary Hair Grass. E. B. 1190, L. C., *Aira canescens*, 1305. Root of many tufted hairy fibres, bearing usually several stems and tufts of leaves. Stems erect, slender, smooth, six-twelve inches high, leafy below, naked above. Leaves involute, more or less setaceous, especially the root-leaves, erect, slightly downy, sometimes reddish. Panicle lax, branching; branches mostly compound, about three from the same point, nearly erect. Spikelets small, whitish-purple. Glumes longer than the spikelet. Awn twisted below, club-shaped above. On sandy dunes, on the eastern coasts. Perennial. July.

A. 3, C. 4. Lat. 50°—53°. Alt. 0. T. 51°—49°.

XXVII. *Avena*, Linn. in part. Oat Grass. Spikelets arranged in a branching panicle, often pendulous when ripe, almost cylindrical, or laterally compressed, two-three-flowered, rarely four-five-flowered, *the upper floret usually barren*. Glumes convex, more or less compressed, not awned, almost equal, or the lower one a little shorter than

the upper, usually about as long as the spikelet. Lower glumelle cleft or toothed at the summit, bearing a dorsal awn, which is *twisted in its lower portion, and bent about the middle*, sometimes absent by abortion (in the cultivated species). Upper glumelle two-keeled, not awned. Glumellules two, entire or unequally cleft. Stigmas nearly sessile, often distant at the base. Fruit cylindrical, tapering at both ends, with a more or less deep furrow, hairy or smooth at the apex, adhering to the upper glumelle.

SECT. I.—Annual Grasses, without tufts of barren leaves. Spikelets pendulous (after flowering). Glumes five-nine-nerved. Ovary hairy at the apex.

1. **A. fatua**, Linn. Wild Oat or Haver. E. B. 2221, L. C. 1307. Root fibrous, annual. Stem erect, three feet high, more or less, according to soil. Leaves spreading, large, flat, finely ribbed, sometimes hairy. Ligule short, notched. Panicle large, branching; branches simple or compound, spreading, whorled. Spikelets large, pendulous after flowering, usually three-flowered. Glumes equal, large, ribbed, green, scarious, pointed. Glumelles *densely bearded at the base, with fulvous hairs*, the lower one cleft at the apex with a long bent awn, twisted below. A deep scar is at the base of each floret. In corn-fields, sometimes too common. Annual. June, July.

A. 11, C. 50. Lat. 50°–55°. Alt. 0–200 yards. T. 52°–47°.

2. **A. strigosa**, Schreb. Bristle-pointed Oat. E. B. 1266, L. C. 1308. Root fibrous, smooth. Stem three feet high, more or less. Leaves roughish, not hairy. Panicle not so divergent as in *A. fatua*, closer, and with the branches more divided. Glumes acuminate. Glumelles *on a hairy short pedicel, with a single stipitate tuft of bristles*; the lower glumelle is furnished with a few long hairs, and a tuft of bristles where the awn is attached; besides the dorsal awn *there are two shorter ones, terminating the two teeth*. The florets are usually two, but sometimes three or more.

Alien. See "Cybele," vol. iii., pp. 184, 185. In corn-fields. Wales and Scotland. The oat commonly cultivated differs from the above in having the upper floret on a longer pedicel, and the axis is nearly smooth. The lower glumelle is smooth, two-toothed, with or without an awn. This is often found growing wild in barley and wheat fields, &c.

SECT. II.—Perennial, with tufted barren root-leaves. Spikelets not pendulous. Glumes one-three-nerved; ovary hairy at the apex.

3. **A. pubescens**, Linn. Downy Oat Grass. E. B. 1640, L. C. 1310. Root tufted, slightly creeping. Stems erect except at the lowest joint, leafy below, smooth. Leaves flat, obtuse, spreading, invested with many spreading hairs; sheaths usually hairy. Ligules acute. Panicle erect, branches three or four together, erect, rough. Spikelets about three-flowered, *scarcely longer than the lower glume*. Glumes membranous with pellucid edges, three-nerved; upper florets on pedicels, which are *invested with long silky hairs*. Lower glumelle

with a strong dorsal awn. Plentiful in dry chalky pastures. Perennial. July.

A. 18, C. 70. Lat. 50° — 60° . Alt. 0—500 yards. T. 52° — 42° .

4. ***A. pratensis***, Linn. Narrow-leaved Oat Grass. E. B. 1204, L. C. 1309. Root tufted, fibrous. Stem erect, except at the base, smooth, one-jointed. Leaves mostly radical, tufted, rigid, finely serrated at the margins; sheaths smooth. Stem-leaf short, with a very long smooth sheath. Panicle erect, with short, simple branches, upper spikelets sessile, longer than the glumes. Glumes equal, scarious, three-ribbed, containing four-five florets on short, hairy stalks. Lower glumelle scarious, and two or three-toothed at the apex, with a strong dorsal awn inserted above its middle. The lower part of the awn is twisted, and bent below the middle. In dry chalky (?) pastures and heathy places. Perennial. July.

A. 17, C. 70. Lat. 50° — 58° . Alt. 0—800 yards. T. 51° — 39° .

Var. *A. alpina*, Sm. E. B. 2141. There is scarcely any character derivable from the herbage whereby this can be satisfactorily distinguished from the preceding species. The spikelets are on rather longer branches, and the florets are on rather longer pedicels. The glumes are not so scarious, and have more prominent and rougher keels. The lower glumelle has a tuft of hairs at its base, bears a twisted, bent, dorsal awn inserted above its middle, and is scarious at the apex and three-toothed; the upper glumelle is rather more decidedly fringed than in *A. pratensis*. Mountains in Scotland. Perennial. July.

Note.—The *A. pratensis* described above is from Arthur Seat, Edinburgh, and the *A. alpina* is from the Highlands of Perthshire.

Query.—Is not *A. planiculmis*, Schrader, sufficiently distinct from *A. pratensis* and its variety *A. alpina*? In Pritzel's "Index," the figures in E. B. 2141, and E. B. S. 2684, are quoted as illustrative of *A. planiculmis*. Is *A. planiculmis* a luxuriant variety of *A. pratensis*, and *A. alpina* a dwarf variety of the same protean species?

The following is a description of a Grass given to the describer for *Avena planiculmis*, Hook. E. B. S. 2684. Stem tall (nearly two yards high), somewhat compressed, channelled, and rough. Leaves with very rough, furrowed sheaths, keeled, and minutely and beautifully toothed on the keel; teeth callous, pointing upwards. Panicle close, with more or less erect spikelets. Spikelets many-flowered. Glumelles all more or less purplish, between the herbaceous and scarious portions, partial stalks serrated with very fine, clear, callous, upward-pointing teeth. In the "Sylloge Fl. Europææ," this Grass is described as a native of the south and east of Germany and Hungary, &c.

Note.—There is a circumstantial account of this plant in Hooker's "British Flora," 3rd ed., p. 53.

SECT. III.—Perennial Grasses, with tufts of barren leaves. Leaves flat. Spikelets not pendulous. Glumes one-three-nerved. Awn from the middle of the lower glumelle. Ovary smooth.

5. ***A. flavescens***, Linn. Yellow Oat Grass. E. B. 952,

L. C. 1311. Root more or less creeping. Stems leafy, erect, slender, smooth, with usually hairy joints. Leaves narrow, tapering, flat, hairy on both sides, with ribbed, hairy sheaths. Panicle rather close, with partially whorled, unequal, simple or compound, spreading branches, which are nearly erect after flowering. Spikelets two-three-four-flowered, rather longer than the glumes. Upper glume the largest. Florets on hairy pedicels. Lower glumelle awned just above the middle. Upper notched. Meadows, pastures, and grassy places, not unfrequent. Perennial. June.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

SECT. IV.—Annual Grasses. Leaves more or less involute, setaceous. Spikelets not pendulous. Glumelles awned just below the summit.

6. **A. caryophyllea**, Wigg. *Aira caryophyllea*, Linn. Silver Hair Grass. E. B. 812, L. C. 1303. Root small, fibrous. Stems more or less numerous, slender, leafy, six-twelve inches high. Leaves very narrow, with smooth, striated sheaths. Panicle spreading, with mostly ternate branches, which spread after flowering. Spikelets very small, two-flowered. Glumes rather larger than the florets. Lower glumelle awned, two-toothed at the apex. Sandy commons and similar arid places. Annual. May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—450 yards. T. 52°—42°.

7. **A. præcox**, Beauv. *Aira præcox*, Linn. Early Hair Grass. E. B. 1296, L. C. 1304. Root of many long, capillary, often downy fibres. Stems usually numerous, slender, tufted, erect, leafy, smooth, two-six inches high. Root-leaves setaceous. Stem-leaves very short, with long inflated, angular, smooth sheaths; ligule pointed, closely embracing the stem. Panicle spicate, erect, oblong, compact, with short erect branches. Spikelets two-flowered. Glumes somewhat longer than the florets. Lower glumelle awned above the middle, with two subulate teeth at the summit. On dry gravelly places. Annual. May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—550 yards. T. 52°—41°.

XXVIII. **Aira**, Linn. in part. Hair Grass. Spikelets laterally compressed, two-flowered, often with the rudiment of a third pedicelled floret, very rarely three-flowered, arranged in a branching panicle. Glumes keeled, nearly equal, generally longer than the spikelet, not awned. Lower glumelle truncate, irregularly three-five toothed at the summit, furnished with a bent or almost straight awn more or less twisted below. Upper Glumelle two-ribbed. Glumellules two, cleft, toothed or lobed. Stigmas nearly sessile, distant at the base. Fruit oblong, compressed, not furrowed.

1. **A. cæspitosa**, Linn. Turfy Hair Grass. E. B. 1453, L. C. 1300. Roots fibrous, usually forming large and dense tufts. Stems two-four feet high (on dry uplands much shorter and without densely-tufted roots). Leaves rigid, large, flat, furrowed and rather rough; the root-leaves are very numerous and tufted. Sheaths smooth;

ligule oblong, acute, often cleft. Panicle large, spreading. Spikelets small, glossy, usually of a violet colour. Glumes large, scarious at the edges, *with a rough purplish keel*, containing one sessile and one pedicelled floret, both with hairs at the base. Lower glumelle abrupt and notched, *bearing an awn from near its base*. Awn not usually protruding beyond the glumelles. In moist shady places. Perennial, June. There is a sub-variety with viviparous florets.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—1000 yards. T. 52° — 37° .

2. **A. alpina**, Linn. Smooth Alpine Hair Grass. E. B. 2102, L. C. 1301. Like the preceding, only the stems are completely invested with the long smooth sheaths of the leaves. Leaves short, involute, and pointed, deeply furrowed above; ligule large, oblong, blunt. Panicle with closer, nearly erect branches, less numerous and spreading than in *A. caespitosa*. *Glumes large, smooth*. Lower glumelle notched and bearing the awn above its middle. The peduncle of the upper floret is very short and quite smooth. The florets are oftener found viviparous than natural. On lofty mountains in Scotland. Perennial. June, July.

A. 4, C. 10. Lat. 56° — 59° . Alt. 900—1350 or 1400 yards. T. 37° — 33° .

We have seen a series of specimens in the "herbarium" of the learned Curator of the Botanical Society of London, from which it appears that there is no *Aira alpina* in Britain. The various states of *A. caespitosa* appear to be produced by the atmospheric and geographical differences of the situations where they are found.

3. **A. flexuosa**, Linn. Wavy Hair Grass. E. B. 1519, L. C. 1302. Root strongly fibrous. Stem slender, upright, smooth, leafy at the base, twelve-eighteen inches high or more, in a rich soil. Leaves short, involute, almost capillary; ligule short, abrupt (truncate). Spikelets small, glossy, of a violet colour, in a loose, erect panicle; branches opposite, very slender and wavy. *Glumes very unequal*. Upper floret almost sessile. *Awn bent and twisted, half as long again as the glumelles*.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—1300 yards. T. 52° — 33° .

Var. β . Leaves extremely slender and slightly rough; branches of the panicle nearly straight.

Note.—It is suggested that this Grass would be very suitable for lawns.

TRIBE V.—Festuceæ. THE FESTUCA TRIBE. Spikelets peduncled with two or several flowers, rarely sub-sessile, in a branching, rarely in a spicate or clustered panicle; the upper floret is often abortive. Glumes much shorter than the spikelet, seldom surpassing the lower floret. Stigmas sessile or on short styles, reaching to the base of the glumelles, rarely on longer styles, and reaching to the middle of the glumelles.

Genera.—*Phragmites*, *Poa*, *Catabrosa*, *Glyceria*, *Sclerochloa*, *Molinia*, *Briza*, *Cynosurus*, *Dactylis*, *Festuca*, *Bromus*.

SYNOPSIS OF THE GENERA.

Phragmites. Base of the perfect florets surrounded by long hairs; barren floret without hairs at the base. Glumes unequal. Aquatics.

Poa. Florets on an axis (rach) separating at the joints with the florets. Glumes equal or nearly so, not awned. Upper glumelle with two ribs, notched or two-toothed.

Catabrosa. Spikelets compressed, two-flowered; the lower sessile, the upper on a long pedicel. Lower glumelle truncate, toothed, and scarious at the summit. Aquatics.

Glyceria. Spikelets laterally compressed, many-flowered (four-twenty). Lower glume shorter than the upper. Glumelles nearly equal, not awned. Upper one two-ribbed, notched or entire. Aquatics.

Sclerochloa. Spikelets in two distinct rows, usually many-flowered. Glumes mostly scarious. Glumelles horny.

Molinia. Spikelets nearly cylindrical, in a narrow interrupted panicle, with two fertile and one barren floret. Glumes unequal.

Briza. Spikelets ovate-triangular, on very long capillary branches, many-flowered. Glumes nearly equal, turgid. Glumelles cordate at the base.

Cynosurus. Spikelets two-five flowered, much compressed, intermixed with barren spikelets. Glumes and glumelles ciliated. Panicle spicate, unilateral.

Dactylis. Spikelets curved, three-four-flowered. Glumes unequal. Panicle branched; branches with unilateral, compact clusters.

Festuca. Spikelets flattened or almost cylindrical, many-flowered. Lower glumelle not keeled, or only so at the top, bearing a terminal awn, rarely without an awn. Upper glumelle truncate. Ovary smooth, rarely pubescent. Styles terminal.

Bromus. Lower glumelle usually bifid or toothed, bearing a dorsal awn or a terminal one. (?) Upper glumelle scarious, ciliated. Ovary hairy at the apex. Styles lateral.

XXIX. *Phragmites*, Trin. *Arundo Phragmites*, Linn. Spikelets in a very branching panicle, laterally compressed, three-six-flowered florets slightly distant, the lower bearing stamens only and without hairs at the base; the other floret surrounded with long hairs. Glumes keeled, pointed, unequal, shorter than the spikelet; the lower one very small. Lower glumelle narrow, acuminate, elongated, subulate, twice as long as the upper. Glumellules large, entire. Stigmas feathery, on elongated styles, reaching to the middle of the glumelles. Fruit oblong, not furrowed.

***P. communis*, Trin.** *A. Phragmites*, Linn. Common Reed. E. B. 401, L. C. 1294. Root creeping, sometimes bearing barren, prostrate, and rooting stems. Stems stout, tall, erect, leafy. Leaves glaucous, scabrous at the margin, lanceolate, tapering, often horizontal, with long close sheaths, and a crown of hair for a ligule. Panicle very large, with partially whorled, repeatedly compound branches. Spikelets violet-coloured, four-five-flowered. About the banks of ponds and rivers; also in stagnant water. Perennial. July.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

XXX. Poa, Linn. in part. Meadow Grass. Spikelets in a spreading or erect panicle, containing three-five florets or more; the axis (rach) jointed, the joints falling off with the florets. Glumes herbaceous or membranous, almost equal, *not awned*. Glumelles partially membranous, *not awned, falling off with the joints of the axis* (rach). Lower glumelle compressed, keeled, pointed, five-nerved; the nerves usually covered at their lower part with woolly hairs. Upper glumelle two-ribbed, notched, or two-toothed. Glumellules two, membranous, entire, or with a lateral tooth, shorter than the smooth ovary. Stigmas terminal, sessile, or nearly so. Fruit oblong, three-angled.

1. **P. annua**, Linn. Annual Meadow Grass. E. B. 1141, L. C. 1328. Root fibrous, tufted. Stems several, spreading or upright, round or slightly compressed, leafy at the base. Leaves spreading, here and there crumpled or flaccid, with an oblong ligule. Panicle open with spreading branches which are *horizontal or reflected after flowering*, about two from each joint of the axis. Spikelet three-seven-flowered. Glumelles smooth, five-nerved, with hairs at the base of the lower florets. This plant is always found in the vicinity of human dwellings. It follows man in all his migrations, Annual.^(P) In flower or seed during the greater part of the year.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1100 yards. T. 52°—36°.

"Of all our native plants this one (*Poa annua*) is perhaps the most near to universal distribution in Britain; in every province, county, zone, and almost everywhere in abundance. Its frequency, however, diminishes much in the arctic region, and it fails to reach the summits of the loftiest mountains."—Mr. H. C. Watson, in "Cybele," vol. iii., pp. 201, 202.

2. **P. bulbosa**, Linn. Bulbous Meadow Grass. E. B. 1071, L. C. 1329. Root tufted, *bulbous*. Stems erect or slightly reclining, with a swollen or bulb-like base. Leaves short, with long smooth sheaths, and with *oblong pointed ligules*. Panicle rather close, with upright, solitary branches; the lower sometimes in pairs or partially whorled. Spikelets oval, green, or violet-colour, three-six-flowered. Lower glumelle hairy at the keel; upper one ciliated. Stigmas simply feathered. On sandy sea-shores; not uncommon. Perennial. April.

Are not the bulbous roots formed before the development of the stem? The tufts of bulbs usually found have only the leaves on them, and the bulbs which have produced stems seem exhausted. Are not the stems produced from bulbs formed the previous year?

A. 3, C. 6. Lat. 50°—53. Alt. 0. T. 51°—49.

Var. *β. vivipara*. Spikelets transformed into leafy buds.

Var. *γ. verticillata*. Branches of the panicle whorled.

3. **P. laxa**, Hænke. Lax Wavy Meadow Grass. L. C. 1334 h. Root long, with many branching fibres, invested with scales, the bases of the decayed leaves. Stem decumbent at the base, erect, more or less leafy. Leaves flat, slightly rough, with long sheaths which have one prominent rib, and a long (mostly torn) ligule. Panicle somewhat lax, *drooping*, with nearly erect branches. Spikelets mostly

with some of the florets viviparous. Glumes strongly keeled, serrated towards the apex, with a point. Florets with very short hairs at the base, or none. Highlands of Aberdeenshire, Scotland. Perennial. July.

A. 2, C. 3. Lat. 56° — 58° . Alt. 1000—1200 yards. T. 37° — 34° .

P. minor Gaud. *P. laxa* (?) *flexuosa*, Sm. Wavy Meadow Grass. E. B. 1123, L. C. 1334 g. Root fibrous, slightly creeping. Stem erect, leafy at the base, naked above. Leaves with prominent ribs, smooth, hooded at the end, upper ones with long sheaths and acute ligules. Panicle rather close. Spikelets ovate, three-flowered, rarely two-four-flowered. Lower glumelle hairy on the lower half of the keel, or on the pedicel of the floret. Highland mountains, Lachin-y-gar (Loch-na-gar), Aberdeenshire. Perennial. July.

A. 5, C. 3. Lat. 56° — 58° . Alt. 1000—1200 yards. T. 37° — 34° .

4. **P. alpina**, Linn. Alpine Meadow Grass. E. B. 1003, L. C. 1330. Roots creeping, fibrous, densely invested with the sheaths on the decayed leaves. Stem slightly reclining at the base, erect, and slender above, not leafy, quite smooth. Leaves smooth, except at the edges, much shorter than their sheaths; radical leaves tufted, hooded at the end. Panicle diffuse, ovate, or triangular, *erect*, branches nearly solitary, almost erect. Spikelets broad, four-six-flowered. Glumelles more or less hairy, especially the ribs. Generally viviparous. Lofty mountains in Scotland. Perennial. July.

A. 6, C. 12. Lat. 53° — 59° . Alt. 800—1300 yards. T. 40° — 33° .

5. **P. cæsia**, Sm. Hoary Meadow Grass. E. B. 1710, L. C. 1344 a and b. Root tufted, fibrous. Stems *few-jointed*; leafy, a foot or more high, round, striated, quite smooth in the naked part. Leaves flat, pointed, smooth, except at the margin, not longer than the sheaths, with a *long obtuse* ligule. Panicle rigid, nearly erect, slightly spreading, branches few, from the same joint or solitary. Spikelets three-five flowered. Lower glumelle scarcely hairy on the keel. Highlands of Perthshire. Perennial. July.

A. 4, C. 6. Lat. 53° — 58° . Alt. 800 to 1000 yards. T. 40° — 7° .

Var. *P. glauca* β. E. B. 1720. Leaves broader. Panicle rather denser or not so open; branches with more numerous spikelets; spikelets broader, and bearing more florets than *P. cæsia*. Highlands. Distribution same as *P. cæsia*.

6. **P. nemoralis**, Linn. Wood Meadow Grass. E. B. 1265, L. C. 1334. Root tufted, fibrous, scarcely creeping. Stems several, slender, erect, leafy, smooth, striated, knotty. Leaves mostly on the stem, flat, often spreading, with smooth, or almost smooth, sheaths, the upper sheath shorter than the limb; *ligule very short or absent*. Panicle sub-erect or slightly drooping to one side; branches several, unequal, mostly compound. Spikelets oval, lanceolate, three-five-flowered. Glumelles with or without hairs at the base, and the keel is serrated towards the summit. In woods; not uncommon. Perennial. June.

Var. β. Stem stouter, with a denser more erect panicle.

Var. γ. Spikelets three-five-flowered.

P. montana, Par. Mountain Meadow Grass. L. C. 1334 d. Root creeping. Stems slender, upright, leafy about half way up, the upper part naked, striated. Leaves flat, about as long as their sheaths, *with two prominent teeth, one at each side of the base of the limb, where it is joined to the sheath.* Panicles not so diffuse as in *P. nemoralis*, on shorter branches. Spikelets three-five-flowered. Glumes equal, acuminate, nearly as long as the spikelets. Glumelles densely hairy on their keels. Glen Callater, Braemar, Aberdeenshire; Mr. J. Syme. Perennial. June. The distribution of *Poa nemoralis*, *P. Parnellii*, and *P. montana* is not distinguished in the "Cybele."

A. 16, C. 70. Lat. 50°—58. Alt. 0—1000 yards. T. 51°—37°.

7. **P. Parnellii**, Bab. Parnell's Meadow Grass. E. B. 2916, L. C. 1334 c. Root, creeping, (?) fibrous. Stem very slender, above a foot high, smooth, striated. Leaves narrow, pointed, usually as long as their smooth sheaths; ligule very short. Panicle erect when in fruit, closer than in *P. nemoralis*. The spikelets are *rather larger*, and the glumes *more acuminate* than in the former species. Upper Teesdale. Perennial. July. For distribution, range, &c., see *P. montana*.

8. **P. Balfourii**, Par. Balfour's Meadow Grass. E. B. 2918, 1334 e. Root creeping and fibrous, as in *P. nemoralis*. Stems branching at the base, erect, leafy, slender, smooth, striated. Leaves flat, *last joint at a distance from the base*, not longer than their sheaths, rough at the edges, with a large blunt or notched ligule. Panicle erect, slightly spreading, branches unequal, compound, wavy, *not rigid*. Spikelets ovate, acuminate, containing four-five florets (scarcely hairy on any part of specimens from Breadalbane, collected by Mr. J. T. Syme.) The more erect and rigid panicle and the larger ligule are the only obvious marks which distinguish this plant from *P. nemoralis*. Highlands of Scotland and the north of England. Perennial. July.

A. 5, C. 6. Lat. 53°—57°. Alt. 800—1000 yards. T. 40°—37°.

9. **P. trivialis**, Linn. Roughish Meadow Grass. E. B. 1072, L. C. 1332. Root fibrous, creeping. Stems more or less numerous, or nearly solitary; sometimes reclining or rooting at the base, round, or slightly compressed. Leaves narrow, slightly spreading, and somewhat rough. Upper leaf with a sheath longer than its limb; *ligule oblong, pointed*. Panicle diffuse, pyramidal; branches unequal, rough, more or less compound. Spikelets oval, three-five-flowered. Nerves of the lower glumes rather prominent and rough at the keel. This has the reputation of a valuable Grass both for hay and pasture. Common in meadows, &c. Perennial. May.

A. 18, C. 82. Lat. 50°—61. Alt. 0—850 yards. T. 52°—39°.

Var. β . Leaves with quite smooth sheaths.

10. **P. pratensis**, Linn. Smooth-stalked Meadow Grass. E. B. 1073, L. C. 1331. Root creeping, with long runners. Stems ascending, often rooting at the base, round, or slightly compressed below. Leaves quite smooth, upper sheath much longer than the limb, with a *short truncate ligule*, which is the certain and obvious mark distinguishing

this from the preceding species. Panicle diffuse, branches whorled, four-five at a joint. Spikelets oval, three-five-flowered. Lower glumelles five-nerved. This Grass is rather earlier than the preceding, and it also is highly esteemed. Meadows, &c. Perennial. May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—950 yards. T. 52°—37°.

Var. *β. angustifolia*. Leaves narrow, rather rigid and involute. Grows in woods.

Var. *γ. sub-cærulea*. E. B. 1004. Leaves short, with long sheaths, upper compressed. Spikelets broad. On the Scottish and Welsh mountains.

P. sudetica, Hænke. *P. hybrida*, Gaud. Silesian Poa. Rehb., i., 90. Roots perennial and creeping. Stems erect, smooth, striated, somewhat compressed, leafy, with stolons and barren shoots at the base. Root-leaves tufted, numerous, broad, with short abrupt points. Stem-leaves long, flaccid, linear, keeled very rough; ligule very short, truncate, nearly obsolete. Panicle large, rather close, the lowermost branches drooping, spikelets ovate, numerous, compressed, four-five-flowered; florets strongly nerved, and without the web of hairs connecting their bases. In the grounds of the Royal Hospital, Chelsea; abundant. Perennial. June, July. This Grass was first observed in 1851, but it had the appearance of having been well established for years prior to this date. A valuable agricultural Grass.

11. **P. compressa**, Linn. Flat-stalked Meadow Grass. E. B. 365, L. C. 1333. Root creeping, with downy fibres. Stems ascending, often rooting at the base, leafy below, remarkably compressed, with two prominent angles. Leaves short, with short, somewhat inflated sheaths, and short truncate ligules. Panicle rather close, oblong; branches short. Spikelets oval-oblong, five-nine-flowered. Lower glumelles indistinctly nerved, with or without hairs at the base. On old walls, and on rocks and dry barren ground; not common. Perennial. June.

A. 15, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

12. **P. polynoda**, Par. Many-jointed-stalked Meadow Grass. Stem reclining at the base, then erect, ridged, smooth, with several constricted joints, last one nearer the top than in *P. compressa*. Leaves short, striated, smooth, with an abrupt, bluntish point, and a rather herbaceous ligule. Panicle small, close, erect; branches simple and compound. Lower glume acuminate, slightly ciliated on the rib (keel), especially near the apex. Glumelles slightly hairy. West of England. Perennial. July. Distribution as above. (See *P. compressa*.)

XXXI. **Catabrosa**, Beauv. Whorl Grass. Spikelets in a branching panicle, two-flowered, the lower floret sessile, the upper one on a long pedicel. Glumes membranous, the lower one short, the upper oboval. Glumelles membranous, not awned, nearly equal in length, the lower one strongly keeled, truncate, toothed and scarious at the top, three-five-nerved, the upper convex, two-nerved, truncate or notched. Glumellules two, free, slightly truncate. Stigmas nearly sessile, terminal, persistent at the base. Fruit oblong, slightly compressed.

C. aquatica, Presl. Water Whorl Grass. E. B. 1557, L. C. 1320. Root creeping or floating. Stems either several or solitary, floating, branching, leafy, smooth, rising about a foot above the water. Leaves flat, obtuse, more or less floating, smooth except at the edges, flaccid. Sheaths lax, slightly compressed. Stipule prominent, oblong, pointed. Panicle erect, with spreading, whorled branches. Spikelets small, with caducous florets. Glumes short. Glumelles much longer than the glumes, with prominent nerves. In ditches, pools, and brooks, &c.; not common. Perennial. May.

A. 18, C. 70. Lat. 50° — 61° . Alt. 0—200 yards. T. 51° — 45° .

XXXII. Glyceria, Br. Sweet Grass. Aquatic, sometimes floating plants. Spikelets in a branching or clustered (racemose) panicle, containing from *four-twenty florets*. Glumes membranous, obtuse or slightly toothed, the lower one smaller than the upper. Glumelles *nearly equal, membranous at the edges, rounded at the top*; the lower convex, with from seven-nine more or less distinct and prominent nerves; the upper scarious, with two ribs, either notched or entire at the top. Glumellules two, obtuse, more or less cohering. Stigmas feathery, terminal. Fruit oblong, slightly compressed.

1. **G. plicata**, Fries. Folded-leaved Sweet Grass. E. B. 1520, L. C. 1322*. Roots fibrous. Stem prostrate and rooting below, often floating, the upper portion bearing the panicle being usually the only erect part of the stem. Leaves flat, large, often floating. Panicle long, lax, slightly spreading in flower, nearly erect in fruit. Spikelets an inch long, sessile or shortly pedicelled, oblong, linear with *ten-fifteen florets* on a jointed axis. Lower glumelles green, with rather prominent nerves, scarious and shining at the margin and summit. In ditches and watery places; common. Perennial. June.

A. 18, (?) C. 80. (?) Lat. 50° — 60° . Alt. 0—200 yards. T. 50° — 46° .

2. **G. fluitans**, Br. Floating Sweet Grass. Root and stem as in *G. plicata*. Leaves rather longer and not quite so blunt; there is a small point (mucro) which terminates the leaves of both species. Panicle very long, *simple*, one-sided. Spikelets partly almost sessile, or on short peduncles; some, especially the lower, on very long, simple peduncles, bearing a sessile lateral spikelet and a terminal one. Spikelets oblong, much larger than in *G. plicata*, and containing *fifteen-twenty florets*. Glumes scarious, *and longer in proportion than in G. plicata*. Glumelles herbaceous except at the margin and tips, with elevated ribs. In ditches and watery places with the former. Perennial. June.

A. 18, C. 82. Lat. 50° — 60° . Alt. 0—500. T. 52° — 41° .

I am indebted to Mr. F. Townsend for the following description of a supposed species of GLYCERIA, named by him *G. pedicellata*. I am not in possession of specimens, and therefore beg to give its characters in the identical terms of its discoverer:—

"*G. pedicellata*. Panicle simple, elongate, subsecund; branches simple, always spreading, lowermost mostly in threes; rachis smooth;

spikelets linear, of seven-sixteen obtuse florets; *outer pale* (glumelle) *oblong, twice as long as broad*: apex entire or slightly and irregularly denticulate-crenate; *anthers three times as long as broad*; *sheaths sulcate*. Rachis perfectly smooth, never swollen as in *G. plicata*. Leaves plicate, acute; sheaths roughish; ligule obtuse, somewhat apiculate. Panicle subsecund, elongate; branches not bearing more than six spikelets, one branch only of each of the lowermost clusters bearing several spikelets; spikelets more or less stalked; pedicels slender, flexible. Outer pale (glumelle) strongly ribbed when dry, more membranous than in the other two species; inner one rather shorter than the outer. Squamulæ with an inflated appearance. Anthers always yellow; lips incurved after bursting. The careopsis has not been observed. It flowers from June to September, and has been noticed in several places in Cambridgeshire, and at Dovedale near Blockley, Worcestershire. It is found in stagnant and running water."

Note.—It is believed that the species of aquatic *Glycerias* might be still further increased; but perhaps with little advantage to science.

3. *G. aquatica*, Sm. Reed Meadow Grass. E. B. 1315, L. C. 1321. Root creeping. Stems *stout, erect, usually about six feet high*. Leaves *flat, broad, with a short abrupt point*; ligule short, truncate. Panicle large, with panicked branches, spreading. Spikelets ovate-oblong, five-nine-flowered. Lower glumelles usually violet, with slightly prominent nerves, yellow and scarious at the top. Stigmas repeatedly divided, bushy, on styles longer than themselves. Banks of rivers, ponds, &c. Perennial. July.

A. 15, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

XXXIII. *Sclerochloa*, Beauv. *Glyceria*, Sm. Hard Grass. Spikelets more or less cylindrical, in panicles which are either close, lax, or very diffuse, bearing five-fifteen florets, in two rows. *Glumes unequal*, mostly scarious. Glumelles *rather horny*, the lower with three dorsal and two marginal rather indistinct nerves. Upper glumelle narrower, with two marginal nerves, finely serrated or ciliated, notched, or two-toothed. Stigmas branched and feathery. Seed cylindrical, oblong, furrowed.

The herbage of the species of this genus is more rigid than that of the *Glycerias*, the spikelets bear fewer florets, and the glumelles are more horny.

1. *S. maritima*, Lind. *Glyceria maritima*. M. and K. Sea Hard Grass. E. B. 1140, L. C. 1323. Root creeping. Stems erect, reclining at the base; rigid. Leaves *involute*, sharp-pointed, with slightly swollen, two-toothed sheaths; stipules small; root-leaves tufted, all more or less glaucous. Panicle spreading in flower, *erect in fruit*. Spikelets linear, adpressed, four-eight-flowered. Florets cylindrical. Glumes almost scarious. Glumelles obtuse, scarious at the top, nerves not reaching to the summit. Var. β . Stem compressed; rach rough. In salt marshes; common. Perennial. July.

A. 18, C. 50. Lat. 50°—61°. Alt. 0. T. 52°—45°.

2. *S. distans*, Bab. *G. distans*, Sm. Reflexed Hard Grass.

E. B. 986, L. C. 1324. Root fibrous, not creeping. Stems several, leafy, round, reclining at the base, erect, about a foot high. Leaves flat, short, with very long, smooth, striated sheaths, *not toothed at the summit, as in S. maritima*; ligule short. Panicle erect, with several series of half-whorled, alternate spreading branches, *the upper horizontal, the lower deflexed*. Spikelets somewhat elliptical, small, shining, four-six-flowered; both spikelets and florets much smaller than in *S. maritima*. Stigmas densely feathery. On sandy waste places near the sea. Perennial. July.

A. 13, C. 40. Lat. 50°—57°. Alt. 0—100 yards. T. 52°—47°.

3. **S. Borreri**, Bab. Borrer's Hard Grass. E. B. 2797, L. C. 1324 b. Root fibrous, tufted, bearing tufts of short, flat, narrow, blunt leaves, constricted at the top of the sheath, *not so prominently toothed as in S. distans*. Panicle rather close, with only a few elongated, divergent (not horizontal and deflexed), hispid branches. Spikelets three-four-flowered. Glumes minute, rather herbaceous. Lower glumelle more pointed and not so scarious as in *S. distans*. In muddy salt marshes. Perennial. June. Distribution not yet ascertained. Range, &c., as in *S. distans*, from which this form is not separated in "Cybele," and perhaps not in nature.

4. **S. procumbens**, Beauv. *G. procumbens*, Sm. Procumbent Hard Grass. E. B. 532, L. C. 1325. Root fibrous. Stems several, more or less erect, always prostrate at the base, five-nine inches high, smooth, leafy. Leaves flat, with long swollen sheaths constricted at the summit; ligule pointed. Panicle compact, with simple alternate spreading branches, *in two opposite ranks*. Spikelets sessile on the branches, in two opposite rows, containing about five florets. On the sea-shore. Annual. July.

A. 11, C. 25. Lat. 50°—55° (57°). Alt. 0. T. 52°—48°.

5. **S. rigida**, Link. *G. rigida*, Sm. Hard Meadow Grass. E. B. 1371, L. C. 1326. Root fibrous, woolly. Stems several, erect, wiry and rigid, like all the British species of the genus. Leaves narrow, pointed, rather longer than the sheaths. Panicle lanceolate, with mostly sessile spikelets in two rows, each containing about seven florets. Glumes acute, strongly-keeled; stigmas nearly sessile, large, tufted. On dry banks and walls. Annual. June.

A. 14, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

6. **S. loliacea**, Woods. *G. loliacea*, L. C. *Triticum loliaceum*, Sm. Dwarf Sea Wheat Grass. E. B. 221, L. C. 1327. Root many long downy fibres. Stems several, more or less erect or decumbent, much branched at the base, very rigid and smooth, only a few inches high. Leaves flat, involute when dry. Spikelets, except in luxuriant plants, quite sessile, alternate, and somewhat unilateral, hence the inflorescence is spiked, not paniced. Florets numerous, ten-fifteen, *in two ranks, imbricated*. Glumes strongly-keeled, more herbaceous than is usual in the British species of this genus. Stigmas feathery, sessile. Sandy sea-shore. Annual June.

A. 12, C. 30. Lat. 50°—57°. Alt. 0. T. 52°—48°.

XXXIV. **Molinia**, Moench. *Melica*, Sm. Purple Melic Grass. Spikelets in a close, erect, interrupted panicle, *two-flowered*, with a *superior, barren floret*, the upper perfect floret pedicelled. Glumes membranous, convex, unequal, the lower and larger with two nerves. Glumelles nearly equal in length; the lower convex, five-nerved, the upper two-nerved, notched. Glumellules two free, obliquely truncate. Stigmas feathery, terminal. Fruit oblong, cylindrical, slightly furrowed in front. The sheath of the lower leaf covers the knots of the stem and the sheaths of the upper leaves.

M. cærulea, Moench. *Melica cærulea*, Sm. Heath Purple Melic Grass. E. B. 730, L. C. 1319. Roots strongly fibrous, almost woody, surrounded above with the bases of the decayed leaves. Stems rather bulbous at the base, very rigid. Leaves almost all radical, tapering, pointed, hairy, especially near the top of the sheath. Panicle erect, with wavy, somewhat rough branches. Spikelets small, bluish, or violet-coloured, rarely green. In barren, sandy, boggy ground; on mountainous heaths; common. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 3—950 yards. T. 52°—37°.

XXXV. **Briza**, Linn. Quaking Grass. Totter Grass. Spikelets five-ten-flowered, *broadly ovate or cordate or triangular*, on long pedicels, pendulous and tremulous, usually in a diffuse panicle. Glumes almost equal, nearly round, convex, inflated with a slight lateral compression. Glumelles herbaceous, the lower nearly round, convex, compressed, *cordate at the base*, rounded at the summit; upper smaller, two-ribbed. Glumellules two, distinct, entire or slightly two-lobed. Stigmas feathery, branching, terminal. Fruit compressed.

1. **B. media**, Linn. Common Quaking Grass. E. B. 340, L. C. 1335. Roots tufted, slightly creeping. Stems smooth, leafy below. Leaves flat, deep green, with a short ligule. Panicle very slender, lax, spikelets ovate, broad, *of a purplish brown tinge*, containing about seven florets, *a little longer than the glume*. Pastures. Perennial. June.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—650 yards. T. 52°—40°.

2. **B. minor**, Linn. Small Quaking Grass. E. B. 1316, L. C. 1336. Root fibrous, downy. Stems solitary or several, eight-ten inches long. Leaves *light green*; stipule long, acute. Panicle spreading with zigzag branches. Spikelets green and white, shorter than the glume. Fields. Annual. July.

A. 2, C. 4. Lat. 50°—51°. Alt. 0—50 yards. T. 52°—51°.

XXXVI. **Cynosurus**, Linn. Dog's-tail Grass. Spikelets two-five-flowered, in a compact, elongated, unilateral, spicate panicle, *intmixed with barren spikelets*, which consist of glumes and glumelles only, and are two-rowed and parallel to the fertile spikelets. Glumes membranous, keeled, acuminate, or with a short awn. Lower glume pointed or awned at the summit; the upper, two-nerved and two-toothed. Glumellules entire, or with a lateral lobe. Stigmas feathery, terminal. Fruit oblong, compressed.

1. **C. cristatus**, Linn. Crested Dog's-tail Grass. E. B. 316, L. C. 1337. Root tufted with long fibres. Stems slender, round, smooth, erect, except at the base; leafy, except above. Leaves narrow, with long, smooth, striated sheaths. *Panicle close, cylindrical, elongated*, with the branches on one side. Glumes and glumelles of both fertile and barren florets, narrow, long-pointed or nearly awned. In meadows, pastures and grassy places. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—500 yards. T. 52°—43°.

2. **C. echinatus**, Linn. Rough Dog's-tail Grass. E. B. 1333, L. C. 1388. Root fibrous, downy. Stems usually solitary, erect. Leaves flat, broad at the base and tapering to a point. *Panicle spicate, dense, oblong, ovate or nearly capitate*, with the branches mostly on one side. Spikelets pubescent. Glumes and glumelles of both fertile and barren florets, furnished with very long awns. In cultivated fields or sandy ground near the sea. Not a native of the British Isles. Channel Islands. Annual. June.

XXXVII. **Dactylis**, Linn. Cock's-foot Grass. Spikelets concave, three-four-flowered, in roundish, compact and unilateral clusters (tufts), on a lateral lax or spicate panicle. Glumes membranous, *unequal, compressed, keeled, acuminate*; one side very convex, the other with a corresponding concavity. Lower glumelle five-nerved, keeled, *bearing a short awn*; the upper one two-keeled and two-toothed at the summit. Glumellules two, unequally two-lobed. Stigmas feathery, terminal. Fruit oblong, slightly compressed.

D. glomerata, Linn. Rough Cock's-foot Grass. E. B. 335, L. C. 1339. Root fibrous, tufted. Stem erect, rigid, stout, leafy, sometimes rather rough at the upper part. Leaves flat, slightly keeled with rough, compressed, keeled sheaths, cleft only near the top. Panicle alternately branched, open below, close above; lower clusters on long stalks, upper on short ones. Spikelets in dense one-sided clusters, on short, stiff, very rough, angular foot-stalks. Upper almost sessile. In meadows, hedges, and shady places. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—450. T. 52°—42°.

XXXVIII. **Festuca**, Linn. Fescue Grass. Spikelets containing five-ten florets (sometimes more, sometimes fewer), usually on long pedicels, and in a panicle or cluster. Glumes nearly equal, either herbaceous or membranous, keeled, rarely with an acuminate awn. Glumelles membranous or herbaceous, almost equal; lower glumelle *not keeled*, or only keeled at the apex, convex, nearly cylindrical, pointed, with or without a terminal awn; upper glumelle truncate, two-ribbed, notched, or two-toothed. Glumellules cleft, rarely entire. Ovary smooth, rarely pubescent. Stigmas feathery, terminal, *sessile, or on very short styles*. Fruit oblong, slightly compressed, usually with a deep furrow.

SECT. I.—Plants annual. Spikelets on longish peduncles (branches), in a narrow, branching panicle; branches (peduncles) slender at the bases

thicker at the summit. Florets lanceolate-subulate, with very long awns, often bearing only one stamen. Upper glumes scarcely ciliated.

1. **F. bromoides**, Linn. Barren Fescue Grass. E. B. 1411, L. C. 1341. Roots fibrous, tufted. Stems several, or almost solitary, about a foot high, erect, slender, smooth, more or less leafy, six-eighteen inches high. Leaves narrow, involute, shorter than their sheath. Panicle *one-sided, narrow*, rather close, slightly branched, sometimes quite simple. Spikelets on short pedicels, or nearly sessile, three-four-flowered. *Lower glume much smaller than the somewhat awned upper one*; both glumes acuminate. Lower glumelle ciliated with a strong, terminal toothed awn. Annual. June.

A. 16, C. 70. Lat. 50°—58. Alt. 0—200 yards. T. 52°—47°.

Var. β . *F. myurus*, Sm., not Linn. E. B. 1412, L. C. 1341 b. Panicle long, simple and nodding, or drooping. Both forms are found on walls and barren sandy ground.

2. **F. uniglumis**, Soland. Single-glumed Fescue Grass. E. B. 1430, L. C. 1340. Roots of several downy fibres. Stems several, reclining and branching at the base, upright above, stout, smooth, and somewhat leafy. Leaves acute, rather involute, with long inflated sheaths. Panicle simple, or nearly so, close, erect. Spikelets nearly sessile, or quite so, bearing about three perfect florets, and as many barren ones, reduced to an awned glumelle, or to an awn. *Lower glume very short; upper one with a long awn*. Lower glumelle with a very long awn; upper one with two short awns. Lower florets sessile; upper ones all pedicelled. On sandy sea-shores; Sussex and Essex coasts. Biennial. June.

A. 7, C. 15. Lat. 50°—54°. Alt. 0. T. 52°—49°.

SECT. II.—Plants perennial. Root tufted or creeping, bearing tufts of barren leaves. Panicle branching, spreading. Spikelets on long foot-stalks. Florets lanceolate, pointed, or acuminate, with or without awns. Upper glumelle not ciliated or scarcely ciliated.

3. **F. ovina**, Linn. Sheep's Fescue Grass. E. B. 585, L. C. 1342. *Root tufted, bearing several stems* and tufts of radical leaves. Stems erect, slender. Leaves all setaceous (involute), with long sheaths which are rough only at the slit (edges of the leaves), and with two small teeth at the top (ligule). (?) Panicle usually erect, narrow, often unilateral, with erect branches. Spikelets four-six-flowered. Glumes and glumelles with sharp, elongated points, not awned. Upland pastures. On mountains. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1450 yards. T. 52°—32°.

Var. β . Panicle purplish.

Var. γ . *vivipara*. E. B. 1355. Spikelet converted into a bud.

Var. δ . *duriuscula*. E. B. 470, L. C. 1343. Stems larger. Leaves broader, not so much involute.

4. **F. rubra**, Linn. Creeping Fescue Grass. E. B. 2056, L. C. 1344. *Root creeping, with long, rooting shoots*. Stems erect, knotty at the lower part, striated, smooth. Radical leaves *involute, setaceous*;

stem-leaves flat or involute; sheaths long, with lateral teeth at the summit. Panicle erect, with more or less spreading branches. Spikelets four-six-flowered. Glumes unequal, lower narrower and much shorter than the upper. Lower glumelles awned; awns longest on the upper florets. On the coast, and also in mountainous places. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—850 yards. T. 52°—46°.

5. **F. sylvatica**, Vill. *F. calamaria*, Sm. Wood Fescue Grass. E. B. 1005, L. C. 1345. Root fibrous, tufted. Stems several, tall, erect, leafy, invested at the base with imbricated pointed sheaths. Leaves long, broad, rough, with striated, roughish sheaths, constricted at the top. Panicle spreading in flower, closer in fruit; branches compound, slender, wavy, roughish. Spikelets three-five-flowered. Glumes rather distant, lower one lanceolate, upper broader, pointed, not awned. Lower glumelle rough on the midrib, pointed, but not awned. Woods, north of England, Scotland, and Ireland. Perennial. July.

A. 8, C. 15. Lat. 50°—58°. Alt. 0—200 yards. T. 50°—47°.

Var. β . *decidua*. E. B. 2266, L. C. 1345 b. Leaves not so broad as in the above; florets about two. In similar localities.

6. **F. gigantea**, Vill. Tall Fescue Grass. E. B. 1820. *Bromus giganteus*, Linn. and L. C. 1348. Root tufted. Stems several, tall, erect, leafy, smooth. Leaves flat, long, tapering, with roughish ribs; sheaths smooth; upper sheaths longer than their leaves, auricled at the top. Panicle lax, slightly drooping, lower branches two or three together, the rest alternate. Spikelets about five-flowered with a terminal rudimentary floret. Lower glumelle often cleft, with a dorsal awn attached just below the summit. Awn slightly bent, longer than the glumelle. In woods and moist hedges. Perennial. July.

A. 16, C. 70. Lat. 51°—58°. Alt. 0—200 yards. T. 52°—47°.

Var. β . *triflora*. E. B. 1918. Smaller, with fewer florets; lower glume often reduced to a bristle. Woods. Perennial. July.

7. **F. arundinacea**, Schreb. *F. elatior*, Sm. Reed Fescue Grass, E. B. 1593, L. C. 1346. Root slightly creeping, deep in the ground. Stems smooth, tall, leafy. Leaves flat, broad and smooth, except at the margins; sheaths long, roughish, auricled. Panicle divaricated after flowering, or slightly pendulous; branches spreading and compound, rough. Spikelets ovate-lanceolate, four-six-flowered; florets more or less rough. Glumes unequal, lower smaller than the upper; both scarious at the margin and apex. Glumelles large, equal, lower one scarcely pointed, both scarious at the margins. This Grass varies in luxuriance and rigidity of herbage. In moist rich meadows it assumes a Reed-like aspect; in dry places it does not apparently differ much from the following. Perennial. June.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—44°.

8. **F. pratensis**, Huds. Meadow Fescue Grass. E. B. 1592. L. C. 1347. Root fibrous, tufted. Stems several, erect, not so robust and tall as the preceding. It is distinguished from *F. arundinacea* by the narrower, less spreading panicle, and especially by the branches being

solitary or in pairs; when there are two together *one of them bears only a single spikelet, the other is simply, not repeatedly branched*. Spikelets cylindrical, not ovate, six-eight-flowered. Lower glumelle has often a long, rough terminal awn.

Var. *β. elatior*. Panicle more compound. Plant taller.

Var. *γ. loliacea*, Huds. Sm. E. B. 1821, L. C. 1347 b. Spikelets sessile, solitary, alternate; lower ones slightly pedicelled.

Both forms in moist meadows. Perennial. June.

A. 18, C. 75. Lat. 50°–60°. Alt. 0–200 yards. T. 51°–45°.

XXXIX. Bromus, Linn. Brome Grass. Spikelets five-ten- or more-flowered, in a more or less lax panicle. Glumes herbaceous-membranous, usually keeled, without awns, unequal. Lower glumelle herbaceous, convex, not keeled, or only slightly keeled at the top, *often cleft or two-toothed, bearing a dorsal awn inserted just below the top*, rarely without an awn. Upper glume scarious, two-keeled, ciliate, notched or two-toothed. Glumellules two, oboval, entire. Ovary hairy at the apex. Stigmas feathery, sessile, not quite terminal, as in *Festuca*, but growing from the side either about the middle of, or under the summit of the ovary. Fruit oblong, linear, convex at the back, with a furrow in front.

SECT. I.—Plants usually perennial; upper glumelle scarcely ciliated, pubescent.

1. **B. asper**, Linn. Hairy Wood Brome Grass. E. B. 1172, L. C. 1349. Root strongly fibrous. Stems nearly solitary or few, upright, not smooth, tall, leafy. Leaves spreading, large, flat, acuminate, fringed with long, spreading hairs; *sheaths rough, with deflexed hairs*; stipule short, obtuse. Panicle spreading, *pendulous*, very large; branches long, rough, divided, about two together, pendulous. Spikelets linear-lanceolate, six-eight-flowered. Glumes unequal, strongly ribbed and rough, scarious at the tips and margins. Lower glumelle awned from just below the summit, hairy towards the base. Awn not longer than the glumelle, stout, nearly straight. Woods and hedges. Annual or biennial. (?) July.

A. 16, C. 70. Lat. 50°–58°. Alt. 0–200 yards. T. 52°–47°.

This Grass in its general aspect and localities much resembles *Festuca gigantea*, but is easily distinguished from the latter by its rough hairy sheaths and short awns.

Note.—The branching, strong, fibrous root of this Grass is unlike that of an annual, or even biennial.

2. **B. erectus**, Huds. Upright Brome Grass. E. B. 471, L. C. 1353. Root strong, woody, scaly, producing tufts of radical, barren leaves. Stems rigid, smooth, reclining at the base. Radical leaves very narrow, furrowed and fringed with long hairs; stem-leaves broader, not so rough, with almost smooth sheaths. Panicle inclined at first, then *erect*, rigid, rather close, with upright branches. Spikelets lanceolate, five-ten-flowered, with a violet tinge. Glumes nearly equal, lanceolate, acuminate, keeled, and ribbed. Lower glumelle

with a short, *almost terminal, rough awn*; upper with two marginal ribs, which unite at the apex. On sandy soils overlying the chalk. Perennial. June.

A. 10, C. 30. Lat. 50° — 57° . Alt. 0—200 yards. T. 51° — 47° .

SECT. II.—Plants annual, rarely biennial. Upper glumelle ciliated.

§ 1. Spikelets dilated at the apex after flowering (florets divergent). Awns of the lower florets longer than the awns of the upper ones.

3. **B. sterilis**, Linn. Barren Brome Grass. E. B. 1030, L. C. 1350. Root small, fibrous. Stems erect, from eighteen-twentyfour inches high, slender, leafy. Leaves soft and downy, sheaths more or less hairy. Panicle lax, spreading, *pendulous after flowering*. Spikelets slightly scabrous, oblong. broader at the apex than at the base, five-nine-flowered. Lower glumelle notched at the apex, bearing a strong, lengthy awn in the notch. Upper glumelle ciliated. Waste ground, hedges and walls. Annual. June.

A. 16, C. 70. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

4. **B. diandrus**, Curt. *B. madritensis*, Linn. Upright Annual Brome Grass. E. B. 1006, L. C. 1351. Root small, fibrous. Stems about a foot high, leafy, slender, smooth. Leaves smooth, as are also the sheaths (slightly hairy below the ligule and at the margins of the sheaths). Panicle *erect, spreading, rather close*. Spikelets lanceolate, elongate on short hairy pedicels. Lower glume a mere bristle, with a scarious wing at the base; upper one with two strong ribs; florets about twelve. Lower glumelle rough, with a stout longish awn, and two scarious, acuminate teeth at the summit; upper one acuminate, blunt, with a fringe of longish hairs. *Stamens two*. Stigmas feathery on short lateral styles. On walls and sandy ground. About Wandsworth steam-boat pier. An-

Bromus mar has a more
spreading panicle than *B. diand*
and on much longer pedicels
B. com. has smaller spikelets
than *B. mol.*

L. C. 1354. Root fibrous, downy. Stems slender, erect, leafy, *smooth*, with hairy joints. Leaves with minutely hairy and rough ribs; sheaths smooth. *Panicle compact, nearly or entirely simple, erect, or slightly pendulous when mature*, with numerous whorled mostly simple branches. Spikelets ovate-oblong, imbricated in blossom, distinct in fruit, six-ten-flowered, rigid, smooth, shining. Glumes unequal, obtuse, scarious at the tip and margin. Lower glumelle inflated, blunt, notched, and awned, sometimes without an awn, broad and membranous; upper glumelle scarious, two-ribbed and ciliated. Corn Fields. Annual. June. July.

A. 17, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

B. arvensis, Linn. Field Brome Grass. E. B. 1984, L. C. p. 15. Stem erect, two-three feet high, hairy, as are also the leaves. Panicle compound, spreading, drooping, or even pendulous when mature, the lowest branches have bracts at the base—a great peculiarity. Sowerby, in E. B., 2nd ed., vol. i., p. 66. Spikelets lanceolate, tapering. Wandsworth steam-boat pier. In this locality its exotic origin is unquestionable. Annual. June—September.

B. patulus, M. and K. Patulous Brome Grass. Rchb. i., 74. Very similar to the above, only the panicle is smaller, or rather not compound. Spikelets lanceolate, bearing many more florets than is usually assigned as characteristic of this species. With *B. arvensis*. Annual. July—October.

7. **B. racemosus**, Linn. (?) (Parl.) E. B. 1079, L. C. 1356 b. (?) Stems often solitary, two-three feet high. Leaves and sheaths hairy; *hairs short, spreading*. Panicle erect, or slightly drooping; branches short. Spikelets *ovate-oblong*. Five-ten-flowered, erect, or slightly drooping. Florets oblong-obovate, imbricated, the *lower glumelle larger than the upper one*, shining, with scarcely prominent nerves, awn about as long as the glumelle. Fields, rubbish, &c. Annual. May—July.

8. **B. commutatus** (?)* Meadow Brome Grass. E. B. 920, L. C. 1355. Root consisting of several stout fibres. Stems reclining and branching at the base, clothed with leaves. Leaves soft, furnished with more or less dense, spreading, or deflexed hairs; stipules short, blunt. *Panicle loose, slightly pendulous*; branches rough, with minute erect teeth. Spikelets cylindrical, tapering at both ends; florets six-eight, spreading in fruit. Glumes scarcely ciliated on the midrib, with a short point, not rough. Lower glumelle inflated, with an awn nearly its own length; upper glumelle with long, but not numerous fringes. Meadows and pastures. Annual or biennial. June.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—400 yards. T. 52°—43°.

Mr. Babington quotes no authority for this species, 2nd ed., 398, but he appears to think it *B. pratensis*, Sm., E. B. 920. In Smith's "Eng. Flora," Smith sets *B. pratensis* as a synonyme of *B. racemosus*, and quotes E. B. 1984. For *B. arvensis* he quotes E. B. 920. Is it a variety of *B. racemosus*, or of *B. mollis*? We have seen a

* These reputed species of *Bromus* are kept separate rather in deference to authority than from a belief in the possibility of assigning distinctive marks whereby they may be recognised and identified.

dried species marked *commutatus*, but it did not appear to differ from some states of *B. mollis*.

9. **B. mollis**, Linn. Soft Brome Grass. E. B. 1078, L. C. 1356. Root fibrous, whitish. Stems several, downy, shorter or longer, on poor or rich soil. Lower leaves downy or hairy, soft, *with downy or hairy soft sheaths*; stipule short, obtuse. *Panicle close, erect*, simple or compound, depending in this latter character on the size of the plant, *branches short*. Spikelets *ovate-oblong*, five-ten-flowered, soft and downy, slightly compressed. Florets closely imbricated. Glumes elliptical, acute. Lower glumelle rather longer than the upper, strongly-ribbed when mature, with a straight awn from below its notched summit. Awn about as long as the glumelle. Pastures and grassy places. Annual. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—43°.

XL. Brachypodium, Beauv. False Brome Grass. Spikelets many-flowered, *sessile or nearly so*, placed alternately on a continuous wavy, angular axis. Glumes unequal. Lower glumelle convex, or rounded, with a terminal awn. Upper one strongly fringed (ciliate) with rigid hairs. Styles terminal. The sessile spikelets generally distinguish this genus from *Festuca*, as also the more ciliated upper glumelle. The unequal glumes distinguish it from *Triticum*.

1. **B. sylvaticum**, Beauv. Slender False Brome Grass. E. B. 729, L. C. 1357. *Roots tufted*. Stems slender, leafy, slightly hairy, two feet high, leaves flat, pointed, ribbed, hairy, soft, *with close and hairy sheaths*. Spike simple, six-eight inches long, drooping. Spike linear, oblong, alternate, many-flowered, in two rows. Glumes unequal, hairy, one, pointed, the other awned. Lower glumelle hairy at the summit, *with a terminal awn*. Styles short, with small feathery stigmas. Fruit free from the glumelles. Woods and hedges; not uncommon. Perennial. July.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—250 yards. T. 52°—44°.

2. **B. pinnatum**, Beauv. Heath False Brome Grass. E. B. 730, L. C. 1358. Root scaly, *creeping*. Stems rigid. Leaves flat, *glabrous or slightly rough or pubescent*. Spike simple. Spikelets nearly sessile, in two rows (spikelets sometimes on a very short, stout pedicel, with a minute bract at the joint or base of the pedicel), cylindrical, tapering at both ends, somewhat curved about the middle. Glumes of nearly equal length, the lower linear-lanceolate, acuminate, the upper elliptic and provided with a *short awn*, both ribbed. Lower glumelle ribbed, awned, and ciliated; upper ciliated. Open places; also in hedges, &c. Very variable in size; on the Surrey Downs it forms a large hassocky turf. Perennial. July.

A. 7, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

TRIBE VI.—Triticeæ. THE TRITICUM TRIBE. Spikelets sessile, arranged in a spike, the axis of which has depressions corresponding to the spikelets, which are one-two, or many-flowered, when

the florets are two or more, the upper floret is often abortive. Stigmas sessile, or on very short styles.

SUB-TRIBE I.—*Triticeæ veræ*. The True Wheat Grasses. Glumes two; upper rarely absent. Stigmas feathery, adjacent to the base of the glumelles.

SYNOPSIS OF THE GENERA.

Lolium. Spikelets bearing several florets, arranged, one on each side of a continuous axis (rach), which is channelled alternately at each side to receive the spikelets, which are two-rowed and situated *with their back to the axis*.

Triticum. Spikelets solitary, sessile, *laterally* (by the side), *not dorsally* (by the back) arranged on an *alternately toothed*, continuous axis, containing two or more florets.

Hordeum. Spikelets *one-flowered*, usually accompanied with a rudimentary floret, reduced to an awn-like pedicel, rarely two-flowered.

Elymus. Spikelets *two-three together*, sessile, placed alternately on a continuous elongated rach.

XLI. *Lolium*, Linn. Darnel. Ray or Rye Grass. Spikelets solitary, sessile, of several or many florets, in two rows, on an alternately channelled axis, *to which they are dorsally attached*, and placed at greater or less distances apart. Upper glume usually absent in the lateral and present in the terminal spikelets. The lower glume herbaceous, neither keeled (ribbed) nor awned. Lower glumelle convex, with or without a terminal awn; the upper two-ribbed and ciliated. Glumellules entire or slightly two-lobed. Stigmas feathery, sessile, or nearly so. Fruit convex on one side, and flat or slightly channelled on the other, adhering to the upper glumelle.

1. ***L. perenne*, Linn.** Common Ray or Rye Grass. E. B. 315, L. C. 1363. Root fibrous. Stems several, slightly reclining at the base, erect, slender, leafy, rigid, with swollen joints. Leaves flat, striated, smooth, tufted at the root after the first year. Spike nearly upright, with a smooth axis. Spikelets numerous, alternate, usually many flowered. *Glume shorter than the spikelet*. Lower glumelle narrow, linear-lanceolate, with a strong dorsal rib, and a short awn just below the cloven tip. Awn often absent.

Sub-var. *cristatum*. Spikelets more or less spreading, contiguous, forming a crest. This is a very common variety.

Var. *β. tenue*. Plant very slender. Spikelets two-four-flowered.

Var. *γ. aristatum*. Floret with a long awn.

Sometimes the axis is shortened and the spikelets approach so as to form a broad two-rowed spike. A branched variety is also rarely met with in which the spikelets are converted into branches. This is the sub-var. *β. paniculata*. Pastures and fields. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

2. ***L. multiflorum*, Lam.** Italian Ray Grass. *Lolium italicum*, Braun. (?) L. C. 1363*. Root fibrous, bearing several stems with or without tufted leaves at the base. "No barren shoots," Bab. Stems several or solitary, branching at the base, erect, except below, taller

and stouter than any form of the preceding species. Leaves smooth, striated, tapering, flat, *somewhat folded when young*. Spike erect, elongated. Spikelets alternate in two rows, more or less approximated, bearing thirteen-twenty florets. Glume ribbed, about half as long as the spikelet. Lower glumelle convex, *oblong-lanceolate*, with a slight notch, two small teeth, and a not quite terminal awn. Awn sometimes absent. Fifeshire. Mr. J. T. Syme. Annual. (?) June. It appears to be a valuable agricultural Grass, and hence it may be naturalised at no distant period. Alien. At present it cannot be reckoned a reputed naturalised British species.

3. ***L. linicola***, Sond. Stem, leaves, and barren shoots similar to those in *L. multiflorum*, only these parts are smaller in this (a cultivated specimen) than in the former. Spike much smaller. Spikelets more distant and adpressed below, fewer-flowered. Glume nearly as long as the spikelet. *Lower glumelle turgid, ribbed, scarious and blunt at the tip*. This Grass has been found in Sussex. Annual. July. If a genuine species, or sufficiently distinct from *L. multiflorum*, its claims to be numbered among British plants are still slenderer than those of the former. At Wandsworth steam-boat pier, with multitudes of exotics.

4. ***L. temulentum***, Linn. Bearded Darnel. E. B. 1124, L. C. 1364 and 1364 b. Root fibrous. Stems tall, stout, striated, leafy, without barren shoots. Leaves rough above, with roughish sheaths, (?) with a short callous ligule. Spike long, not quite erect. Spikelets six-seven-flowered, *usually shorter than the glumes*. Glumes strongly ribbed, lanceolate not pointed. Lower glumelle turgid, striated with a broad scarious margin, and with a dorsal (longer or shorter) awn. Fruit large, invested by the glumelles.

Var. β . *arvense*. E. B. 1125, L. C. 1364 b. Without awns, or with very short ones. Corn-fields. Annual. July.

A. 16, C. 60. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

XLII. *Triticum*, Linn. Wheat Grass. Spikelets three-five or more flowered, solitary, sessile, placed in two rows on the alternate teeth of a continuous axis, to which their broader side is opposite. Glumes nearly opposite, herbaceous or coriaceous, often inflated, keeled above, equal, with or without awns, pointed or truncate, often toothed. Lower glumelle convex, pointed or with a terminal straight awn; the upper two-ribbed and ciliated. Glumellules two, entire, often ciliated. Ovary hairy at the summit. Stigmas feathery, terminal, nearly sessile. Fruit oblong, furrowed, free, or adhering to the glumelles.

1. ***T. repens***, Linn. Creeping Wheat Grass. E. B. 909, L. C. 1360. *Root throwing out long creeping rhizomes*, more or less scaly (the bases of decayed leaves form the scales). Stems several, erect, tall, slender, smooth. Leaves flat, tapering, rough only above. Spike bearing spikelets in two rows. Spikelets four-six-flowered. Glumes lanceolate, acuminate, ribbed, pointed or awned. Lower glumelle strongly nerved, acuminate, pointed, or awned; upper glumelle ribbed,

nearly as long as the lower one, but not pointed. Common in waste ground and cultivated fields. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—44°.

Var. *β. glaucum*. Plant glaucous. Leaves often spreading.

Var. *γ. subaristatum*. Glumelles with short awns. *T. laxum*, Qu. *T. repens*, var. *β. glaucum*? Stouter and more or less glaucous or greyish. About salt-water ditches; common.

Var. *littorale*? Bab. (Compare Babington *in loco*.)

2. **T. caninum**, Huds. Fibrous-rooted Wheat Grass. E. B. 1372, L. C. 1359. *Roots fibrous, tufted, not creeping*. Stems nearly solitary or several, tall, slender, smooth, leafy. Leaves rough on both sides, sometimes woolly above. Spike elongated, nearly close, with two rows of spikelets. Glumes equal, strongly ribbed, cohering at the base. Lower glumelle strongly ribbed above, with a long terminal awn; upper glumelle finely fringed. This is distinguishable from the preceding by its fibrous, not creeping roots, and by the longer awns. Common on chalky or limestone soil. Perennial. July.

A 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—46°.

3. **T. junceum**, Linn. Rushy Sea Wheat Grass. E. B. 814, L. C. 1362. Root long, creeping, with woolly fibres. Stem erect, rigid, very smooth, leafy. Leaves involute, ribbed, smooth, downy, tapering and sharp-pointed. Spike erect, rigid, containing numerous flat ovate spikelets, which bear five or six florets. *Glumes quite smooth, ribbed, blunt, or notched*, equal. Lower glumelle ribbed, quite smooth, blunt, or notched; upper one smaller, two-ribbed, minutely ciliated. Frequent on the sandy sea-coast with *Arundo arenaria*, *Elymus arenarius*, where it serves in common with them for binding the loose sand. Perennial. July.

A. 18, C. 60. Lat. 50°—61°. Alt. 0. T. 52°—45°.

4. **T. laxum**, Fries. Root creeping. Stems erect. *Leaves flat, covered with scabrous points*, rarely downy. *Glumes obliquely truncate*, not notched. Angles of rach, usually rough.

Is this a synonyme of var. *β. glaucum*? (See above.)

5. **T. cristatum**, Schreb. Crested Wheat Grass. E. B. 2267 L. C. p. 16. Root long, fibrous, woolly. Stems slender, rigid, hairy at the top. Leaves tapering, folded, smooth below, hairy on the upper side, with smooth striated sheaths. Spike an inch or more long, composed of numerous small spikelets, densely crowded. Spikelets three-six-seven-flowered. Glumes with terminal awns. Lower glumelle similar to the glume, but longer; upper notched at the summit. Alien. Stated to have been found by Mr. George Don, on the coast between Arbroath and Montrose. Perennial. July.

T. sativum, Lam. Winter Wheat. (See Fig. 113, p. 192.) Root fibrous. Stems nearly solitary. Leaves large, slightly rough. Spike four-cornered, axis not separating at the junctions. Spikelets imbricated in several rows, four-flowered, smooth, rarely pubescent. Glumes oval, inflated, ribbed only toward the top. Lower glumelle with or without an awn.

Var. *a. muticum*. Winter Wheat. Not awned.

Var. *β. aristatum*. Summer Wheat. More or less awned.

In all temperate regions this valuable plant is found cultivated, but never wild, except where a seed has accidentally been dropped and allowed to grow. Like our domesticated animals, it has never been found wild. By human aid it is almost a cosmopolite; without man's labour it would probably soon degenerate, or even perish.

XLIII. Hordeum, Linn. Barley. Spikelets one-flowered, with a barren floret, rarely two-flowered; about three spikelets together on the teeth of the axis, the lateral spikelets often bearing barren florets, or abortive scales. Glumes not quite contiguous to the florets, linear-lanceolate or subulate, awned. Lower glumelle convex, with a long terminal awn; upper one two-ribbed. Glumellules two, entire, or unequally two-lobed, ciliated, rarely smooth. Ovary hairy at the summit. Stigmas feathery, nearly sessile, and almost terminal. Fruit (seed) oblong, slightly compressed, with a groove on one side, adhering to the glumelles, rarely free.

1. **H. murinum**, Linn. Wall Barley. E. B. 1971, L. C. 1368. Roots fibrous. Stems leafy, tufted at the root, reclining at the base, and spreading, then erect. Leaves flat, with long, lax, ribbed, smooth, *somewhat swollen sheaths*. Spike two or three inches long, cylindrical, dense, two-rowed. Spikelets bearing one perfect and two barren florets, the latter lateral and pedicelled, the former central and sessile. Glumes of the fertile floret lanceolate and ciliate, of the lateral and barren florets only a bristle without teeth. Glumelles about equal, finally forming a cover to the seed. About walls, borders of roads; common. Annual. June.

A. 16, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

2. **H. pratense**, Huds. Meadow Barley. E. B. 409, L. C. 1367. Root fibrous. Stem tall, erect, slender. Leaves roughish, sometimes hairy, *with close sheaths*; radical leaves tufted. Spike one or two inches long, slenderer than in the preceding. Spikelets one-flowered, with lateral, rudimentary florets. Glumes of both perfect and rudimentary or barren florets reduced to bristles. Lower glumelle of the fertile floret awned. In rather moist meadows and pastures. Perennial. June.

A. 13, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

3. **H. sylvaticum**, Huds. Wood Barley. E. B. 1317, L. C. 1366. Root fibrous. Stem erect, two feet high or more, leafy, especially near the base. *Leaves rather broad, flat, tapering, rough on both sides*; sheaths usually very rough, with deflexed hairs. Spike close, erect, green, with a zigzag, angular, furrowed axis. Spikelets one-two-three-flowered, usually two at each joint of the axis. Glumes bristly, slightly awned; central or perfect floret with a long awn; lateral, barren florets with shorter awns. In woods, especially where the soil is chalky or calcareous. Perennial. June.

A. 8, C. 20. Lat. 50°—56°. Alt. 0—200 yards. T. 50°—46°.

4. **H. maritimum**, With. Sea Barley. E. B. 1205, L. C. 1369.

This Grass has the general habit and form of *H. murinum*. The spike is rather denser and more spreading at the top, and the awns are longer. Glumelle of the lateral floret slightly dilated. Sandy seashores. Annual. June.

A. 11, C. 20. Lat. 50°—56°. Alt. 0. T. 52°—48°.

Query.—A genuine species?

In *H. maritimum*, one of the lateral abortive florets is somewhat thickened or swollen at the base, the other is setaceous.

Query.—Are the abortive lateral florets of *H. murinum* both setaceous, and is the awn of the perfect floret in the latter only half as long as those of the two lateral ones? Are these the distinctive characters of the two species?

H. vulgare. Common Barley. Spike slightly compressed laterally. Spikelets one-flowered; awns longer than the spike. Cultivated. Annual. June. Of this species there are numerous varieties.

Secale, Linn. Rye. Spike simple, compressed. Spikelets solitary, on a dilated toothed rach, two-flowered, with a barren rudimentary central floret on a long pedicel (the pedicel only is developed). Glumes nearly opposite, *linear-subulate*, not half the length of the glumelles. Lower glumelle strongly keeled, ciliated, and awned. Glumellules two, entire, ciliated. Fruit oblong, with a furrow on one side.

S. cereale, Linn. Common Rye. Stems usually solitary or few. Leaves broad, more or less glaucous. Spike compressed. Lower glumelle strongly ciliated on the keel, and terminating in a long awn. Fields. May—July. The remains of cultivation.

Ægilops ovata. (?) Host. Gram. vol. ii., fig. 5. Stem six-twelve inches high, with fringed leaves. Glumes ovate, with four long spreading awns. Lower glumelle with two straight awns. Spike few-flowered. Annual. June, July. Wandsworth steam-boat pier.

XLIV. Elymus, Linn. Lyme Grass. Spikelets sessile, two or three together, each containing two or more florets, placed alternately on a continuous, elongated axis (rach). Glumes two, nearly equal, linear, both on the same side of the spikelet. Glumelles two, unequal, the lower ribbed above, hairy at the base, notched at the apex, upper flat or concave, cloven, two-ribbed. Glumellules two, lanceolate. Stigmas feathery, spreading. Fruit very hairy at the apex, furrowed on the face, more or less attached to the glumelles.

1. **E. arenarius**, Linn. Upright Sea Lyme Grass. E. B. 1672, L. C. 1363. Root creeping. Stems reedy, erect, rigid, leafy. Leaves rather rigid, striated, smooth, involute and tapering, ending in a sharp prickly point. *Spikes close, erect*, elongated. Spikelets about three-flowered. Glumes narrow, lanceolate, equal, more or less hairy. Glumelles finely downy at the base; the upper convex, lanceolate, not pointed; upper concave, notched at the summit with two teeth. As the root creeps extensively, the plant rarely flowers. On the sandy

sea-shore ; perhaps the best of all our plants for forming a barrier to resist the encroachments of the ocean. Perennial. July.

A. 16, C. 40. Lat. 50°—61°. Alt. 0. T. 50°—46°.

2. *E. geniculatus*, Curt. Pendulous Sea Lyme Grass. E. B. 1586, L. C. 1365 b. Root scarcely creeping. Plant larger than the preceding, but slenderer in habit. Spike eighteen-twentyfour inches long, originally erect, but when in flower *strongly bent, so as to form an acute angle at the second or third spikelet*. Spikelets three-four-flowered. Glumes longer than in *E. arenarius*, narrow and tapering. Lower glumelle ribbed and downy. On the Thames, by Gravesend Reach. Perennial. July. The plant is only known as a garden plant. Extinct as a wild species. (?) Its continental localities are in South Sweden, Holland, and Belgium. Hence its existence in the south-eastern parts of Britain is not incredible.

SUB-TRIBE II.—**Nardeæ**. Glumes absent. Stigma solitary, elongated, pubescent, much longer than the glumelles.

SYNOPSIS OF THE GENERA.

Nardus. Spikelets *one-flowered* on a unilateral (one-sided) spike.

Lepturus. Spikelets one-flowered, with a barren floret.

XLV. *Nardus*, Linn. Mat Grass. Spikelets bearing one fertile floret only in a one-sided spike. Glumes absent. Lower glumelle lanceolate, three-angled, keeled, acuminate-pointed ; the upper linear-lanceolate. Glumellules absent. Ovary smooth. Stigma solitary, terminal, very long, downy, exceeding the glumelles. Fruit linear, adhering to the upper glumelle,

N. stricta, Linn. Common Mat Grass. E. B. 290, L. C. 1370. Root producing strong rhizomes, which yield numerous, very compactly tufted leaves. Stems slender, rigid, only a few inches high, persistent as well as the glaucous, furrowed, rigid leaves. Spike slender, convex on the side opposite to the spikelets. Spikelets bluish, distant, solitary, containing several florets. Glume tipped with a short awn. On barren, sandy, moist heaths and moors ; common. Perennial. July. The leaves and stems of this plant endure through the winter, and perish only during the succeeding spring and summer.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1100 yards. T. 52°—36°.

XLVI. *Lepturus*, Br. *Rottboellia*, Linn. *Ophiurus*, Beauv. Hard Grass. Spikelets one-flowered, with an imperfect floret, placed on solitary or aggregate spikes, which have a continuous, jointed, and channelled axis. Glumes two, lanceolate, both opposite to the axis of the spikelets, spreading when the plant is in flower. Glumelles two, nearly equal, membranous ; glumelles of the barren floret similar, if it bear stamens, or reduced to a scale. Glumellules two, acute. Stigmas widely spreading on short styles. Fruit shut up in the grooves of each joint by the glumelles, and falling off with the joints.

L. incurvatus, Linn. Sea Hard Grass. E. B. 760, L. C. 1371.

Root fibrous, downy. Stems more or less branching at the base, sometimes repeatedly branched through their whole length, leafy, especially below, round, smooth, rigid, more or less bent. Leaves narrow, spreading, with slightly tumid sheaths. Spikes terminal, long, cylindrical, incurved; the glume fits the groove in the axis so exactly, that before and after flowering the spike presents a uniformly smooth or perfectly cylindrical surface. Spikelets two-flowered, one perfect and one rudimentary. Sea-coast and near tidal rivers. Annual. July. (?)

A. 14, C. 30—40. Lat. 50°—56°. Alt. 0. T. 52°—48°.

ORDER XII.—CYPERACEÆ, Juss. THE SEDGE FAMILY.

Herbaceous plants, often with creeping roots. Stems simple, usually triangular, junction (articulation) of the stem and leaves not enlarged

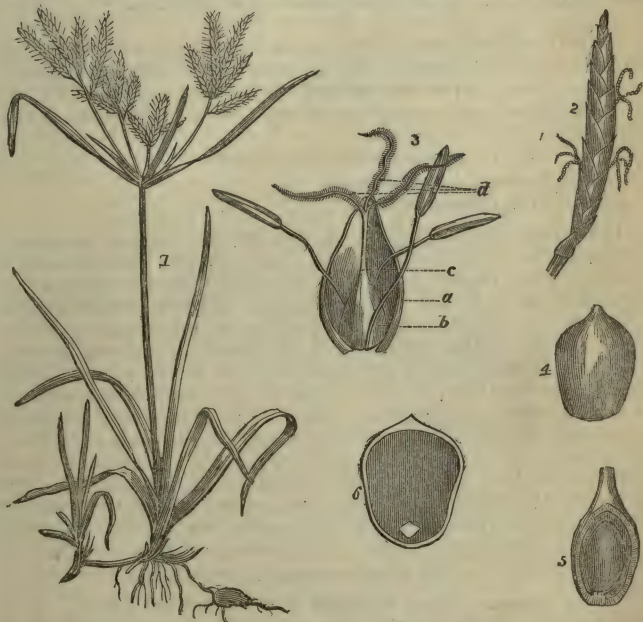


Fig. 114.—*Cyperus rotundatus*. 1, entire plant reduced; 2, a single spike (spikelet); 3, a single flower; a, scale; b, the ovary; c, the style; d, the stigmas; 4, the fruit; 5, a longitudinal section of the ovary; 6, a section of the fruit to show the position of the embryo. Note.—This plant, though not a British species, is sufficiently illustrative both of the order CYPERACEÆ and of the genus *Cyperus*.

(swollen nodose) as in *Gramineæ*. Leaves with long, entire, or partly cleft sheaths, embracing a large portion of the stem, with or without

a ligule; limb usually flat, linear, or plaited (folded), triangular, margins and midrib smooth, or more or less rough or serrulate. Flowers in spikes or in panicles, solitary or aggregate, perfect, or male and female flowers separate. (See Fig. 56, p. 20.) Florets, whether perfect or unisexual, in the axil of a more or less membranous or scarious bract (scale), arranged in many or few-flowered spikes or spikelets in two, three, or several rows (see Fig. 114); the lower scales sometimes barren (male) or empty. Stamens three, rarely two, hypogynous (under the ovary), withering. Anthers two-lobed, with basal insertion. Ovary consisting of two-three carpels, each one-celled, with one ovule. Stigmas two-three, filiform. Fruit (achenium) dry, one-seeded, not opening, triangular-roundish, or more or less compressed, sometimes in a utricle, which falls off with the seed. Seed same shape as the fruit, with a thick farinaceous, or farinaceous-corneous albumen. Embryo very small, near the hilum.

TRIBE I.—*Cariceæ*. THE CAREX TRIBE. Flowers unisexual, monœcious, rarely diœcious. Spikes composed of scales, imbricated in several ranks. Fruit without hairs at the base, enclosed in a peculiar envelope (utricle), open at the apex for the protrusion of the stigmas.

SYNOPSIS OF THE GENERA.

Carex. Fruit enclosed in a utricle.

Elyna. Fruit enclosed in a scale.

I. *Carex*, Linn. Sedge. A very extensive genus of plants, with perennial often creeping roots. Stem simple, triangular, with sharp or blunt edges. Leaves flat or slightly keeled, with sharp edges, and more or less tubular sheaths. Flowers monœcious, in spikes, barren and fertile flowers either in the same spike or in different spikes. Scales imbricated in all directions. Barren flowers, with three stamens, rarely fewer, on the base of the scale. Fertile flowers furnished with a scale similar to the barren flowers, and an urceolate ribbed, contracted, mostly cloven, permanent perianth. Ovary roundish, with three, rarely two angles, one-celled. *Style* one, cylindrical, with three, rarely two, downy, deciduous stigmas. *Seed* somewhat angular. These plants are remarkable for the very sharp corners of the stems, especially in their upper portion; also for the cutting edges of the leaves. By these properties they may generally be distinguished from the other *Cyperaceous* genera.

SECT. I.—Spike simple, solitary, terminal. Stigmas two.

1. *C. dioica*, Linn. Creeping Separate-headed Carex. E. B. 543, L. C. 1204. *Barren and fertile flowers on separate plants.* Roots oblique or horizontal, creeping, often emitting barren stems or leaves. Stems slender, *smooth*. Leaves *smooth*, round and channelled. Spike terminal, solitary; the spike of barren flowers cylindrical, of the fertile ovate. Scales broad, obtuse or abrupt. Fruit* *ovate*, ribbed,

* Fruit in this genus signifies both the usually triangular nut, and the persistent cleft sac, or utricle, in which it is enclosed.

finely serrated, approximate, erect or spreading. Spongy bogs. Perennial. May, June.

A. 17, C. 50. L. 50° — 61° . Alt. 0—100 yards. T. 50° — 37° .

2. **C. davalliana**, Sm. Prickly Separate-headed Carex. E. B. 1123, L. C. Excluded species, p. 16. Root tufted, not creeping. Stem *rough*. Leaves keeled, channelled and rough. Fruit *oblong lanceolate*, strongly ribbed, long-beaked, not serrated as in *C. dioica*, by which mark this species is said to be distinguished from the preceding. In marshes and boggy places. Perennial. May, June. Formerly found near Bath; now lost by drainage.

Query.—Has this plant been found recently?

The author of "Cybele Brit." says—"Probably all the alleged localities," except this one quoted, "were erroneous."

3. **C. pulicaris**, Linn. Flea Carex. E. B. 1051, L. C. 1205. Root tufted. Stems slender, angular, smooth, leafy only at the base. Leaves slender, erect, smooth, except at the summit, roundish-setaceous, furrowed. Spike (spikelet) slender in flower, barren florets in the upper, and fertile in the lower part, which subsequently swells *both kinds of flowers on the same plant*. Scales lanceolate, *deciduous*. Fruit *oblong*, tapering at both ends (the vertical section is elliptical, in *C. dioica* the section of the fruit is ovate), dark brown, smooth and shining, longer than the scale, reflexed when ripe. Bogs; common. Perennial. May.

A. 18, C. 80. Lat. 50° — 61° . Alt. 0—850 yards. T. 52° — 39° .

4. **C. rupestris**, All. Rock Carex. E. B. 2814, L. C. 1207. Root scaly, fibrous, somewhat creeping, bearing small tufts of leaves or barren stems. Stems erect, slender, angular, smooth, except above, three-six *inches high*. Leaves all radical, or at the base of the stem, flat and furrowed below, twisted, triangular, with a rough, slender point. Spikes linear terminal, with male florets above and female ones below. Fruit *obovate, triangular*, with a short stalk and short beak, enclosed in the *persistent* brown scale. Glen Callater, Aberdeenshire, &c. Perennial. July.

A. 2, C. 4. Lat. 56° — 58° . Alt. 700—900 yards. T. 40° — 38° .

5. **C. pauciflora**, Lightfoot. Few-flowered Carex. E. B. 2041, L. C. 1206. Root creeping, with long fibres, scaly. Stems slender, erect, angular, furrowed. Leaves shorter than the stem, sheathing its base, narrow, channelled, smooth. Spike simple, solitary, consisting of one, rarely two, terminal barren florets, and two or three fertile ones, the latter acuminate, slightly ribbed, longer than the deciduous scales. *Fruit lanceolate, tapering*. Alpine bogs, north of England and Scotland; not common. Perennial. June, July.

A. 6, C. 16. Lat. 54° — 59° . Alt. 250—850 yards. T. 45° — 39° .

SECT. II.—Barren and fertile florets in proximate or slightly distant spikelets, rarely only one kind by abortion in the same spikelet.

§ 1. Several of the spikelets unisexual (bearing either barren or fertile florets only).

6. **C. intermedia**, Good. Soft Brown Carex. E. B. 2042

L. C. 1217. Root creeping, deep. Stems erect, eighteen-twentyfour inches high, with rough angles. Leaves sheathing the lower part of the stem, and not quite so long as it, flat, keeled, tapering, rough. Bracts shorter than the spike. Spikelets in an oblong spike; *the upper and lower fertile, the intermediate mostly barren*. Scales shorter than the fruit. Fruit ovate-acuminate, with a rough narrow margin and cleft point. (See "Phytologist," vol. iii., pp. 1036, 1027.) Marshy meadows. Perennial. May, June.

A. 15, C. 50. Lat. 50°—57°. Alt. 0—500 yards. T. 52°—48°.

7. **C. arenaria**, Linn. Sea Carex. E. B. 928, L. C. 1218. Root of very long and strong cord-like fibres. Stems solitary, erect, triangular, smooth, except above, leafy at the base. Leaves flat, rough-edged, tapering, as tall as the stem or taller. Spikelets more or less crowded on an erect spike, *the upper spikelets barren, intermediate ones fertile at the base only, the lower mostly fertile*. Scales acute, rather longer than the fruit. Fruit *ovate, ribbed, flattened*, with a rough margin (wing), and cloven beak. (The fruit in *C. arenaria* is more tapering than it is in *C. divisa*; it has also a wing, and a rather deeper cleft. On the sandy sea-shore. Perennial. June.

A. 18, C. 60. Lat. 50°—61°. Alt. 0. T. 52°—45°.

§ 2. Spikelets composed of both barren and fertile florets. Barren florets at the apex, fertile florets at the base.

8. **C. incurva**, Lightf. Curved Carex. E. B. 927, L. C. 1208. Root creeping. Stem rooting below (emitting, among the sand where it grows, dense tufts of branching fibres), *curved, round*, striated, smooth, leafy at the base, only a few inches long. Leaves short, acute, furrowed, smooth, curved. Spikelets quite sessile, roundish, in a dense, terminal, roundish, or angular spike, subtended by a very short bract. Scales shorter than the fruit, acuminate. *Fruit broadly ovate*, with a short, blunt beak. Slightly notched. Links of Aberdeen, Scotland; shores of Shetland Islands, &c. Perennial. July.

A. 4, C. 9. Lat. 56°—61°. Alt. 0. T. 48°—45°.

9. **C. divisa**, Huds. Bracteated Marsh Carex. E. B. 1096, L. C. 1219. Root creeping, with strong scaly fibres. Stems erect, slender, angular, roughish above, a foot high or more. Leaves erect, narrow, sheathing the base of the stem. Spikelets ovate, the lower often remote, irregularly clustered in an ovate spike, subtended by an erect, leafy, angular bract. Scales elliptical, with a prominent rib and *filmy edge*. Fruit shorter than the scale, *ovate, dilated*, nerved, rough at the edges, and cloven at the point. Near the sea, on the southern and eastern coasts. Perennial. May, June.

A. 8, C. 20. Lat. 50°—54°. Alt. 0. T. 52°—49°.

10. **C. vulpina**, Linn. Great Compound Prickly Carex. E. B. 307, L. C. 1222. Root tufted, not creeping. Stems erect, robust, sharply triangular, angles rough, with concave faces (sides), abruptly contracted at the summit. Leaves very long, rather broad, with very rough edges and keel; capable of making deep incisions on the hand

that handles them incautiously. Spikelets ovate, numerous, in an oblong, compact, or interrupted spike, the *lower usually branched*, compound, subtended by very short and narrow bracts. "Bracts dilated at the base, frequently tapering into a long setaceous leaf-like extremity."—(Leighton.) Scales acute, with long points. Fruit *on a short stalk*, diverging, ovate, ribbed, *tapering into a flat serrated beak*, flat on one side, convex on the other. (See "Phytologist," vol. iii., p. 1038.) About ponds, ditches, &c. Perennial. May.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—46°.

11. *C. muricata*, Linn. Greater Prickly Carex. E. B. 1097, L. C. 1220. Root tufted, fibres shaggy, not creeping. Stems slender, erect, eighteen inches high, leafy only below (at the base), with scabrous angles only at the top, faces (sides) flat. Leaves narrow, rough at the edges and keel, bright green, sheathing at the base, variable in length. Spikelets numerous, *not compound, more or less approximate, often confluent*, ovate in flower, globular, or nearly so, in fruit, some of them bracteate, in an oblong, blunt spike. Scales rusty, pointed, with a green keel. Fruit divergent, flat on one side, convex on the other, with a broad, flat, rough-edged, pointed, prickly beak. (See "Phytologist," vol. i., pp. 779, 780.) Moist pastures. Perennial. May, June.

Var. *β. nemorosa*. Spike with a very long, narrow, leaf-like bract. Scales subulate, much longer than the fruit. Found with the typical form. On dry, gravelly ditch banks, near Eaton, Shropshire. Rev. E. Williams. (Eng. Fl., vol. iv., p. 88.)

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

12. *C. divulsa*, Good. Grey Carex. E. B. 629, L. C. 1221. Root, stem, and colour of herbage, as in the preceding species. Spikelets approximate when in flower, *distant in fruit*, scales ovate-lanceolate, membranous, shorter than the fruit. Fruit spreading, ovate, flat on one side and convex on the other, with a thick green margin, and with a cloven beak. This differs from *C. muricata* chiefly in having the spikelets more distant when in fruit, and the fruit has a thicker margin in this than in the preceding. The stem is also usually slenderer, and rather more leafy. In moist, shady places. Perennial. June.

A. 10, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

13. *C. teretiuscula*, Good. Lesser Panicked Carex. E. B. 1065, L. C. 1223. Root short oblique, with strong fibres and numerous fibrils. Stems obscurely three-sided, rough above, with somewhat convex faces. Leaves long, narrow, erect, sheathing the base of the stem. Spikelets numerous, proximate, in an ovate-oblong, compact, *compound* spike. Bracts membranous, ovate, acute. Scales membranous, acute, brown, with a whitish margin. Fruit stipitate, ovate, gibbous (swollen) at one side, winged, with a tapering beak, which is strongly serrated at the margins. *The convex side of the fruit has a membranous wing*. Boggy meadows; rare. Perennial. June.

Var. *β. Ehrhartiana*. Spikelets lax in an elongated spike. Near Manchester. (See "Phytologist," vol. i., pp. 895, 918, 1140.)

A. 14, C. 30, Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

14. **C. paradoxa**, Willd. E. B. 2896, L. C. 1223*. Root in dense tufts, surmounted by the remains of decayed leaves. Stems three-angled and scabrous above. Leaves very long, narrow. Spikelets numerous, in a narrow, elongated panicle, the lower branches rather distant. Scales brown, membranous, pale at the margin. Fruit stalked, *brown, strongly-ribbed, about as long as the scale, flat on the face and convex-gibbous on the back, without a wing, and with a terminal, two-toothed, rough beak.* Mullingar, Ireland; Mr. D. Moore. In Yorkshire, viz., Ascham Bog and Hislington Field; Mr. R. Spruce. Perennial. July.

A. 1, C. 1. Lat. 53°—54°. Alt. 0—50 yards. T. 48°.

(See "Phytologist," vol. i., pp. 842, 895, 918, 1021, 1119, 1121, 1122.)

15. **C. paniculata**, Linn. Great Panicle Carex. E. B. 1064, L. C. 1224. Roots tufted, crowned as in the preceding, with the decayed leaves forming hassocks often above a foot high. Stems two-three feet high, numerous, *three-angled and rough at the edges, sides flat.* Leaves long, narrow. Spikelets numerous, arranged in a more or less lax panicle, with spreading branches, which are again divided. Scales brown, with a broad, membranous, pale margin. Fruit stalked, brown, shining, roundish below, with a cleft, triangular beak, the convex side winged, about as long as the scale. (See "Phytologist," vol. iii., pp. 1039-40.) In spongy bogs. Perennial. June.

A. 18, C. 70. Lat. 50°—60°. Alt. 2—200 yards. T. 52°—46°.

16. **C. Boenninghauseniana**, Weihe. Boenninghausen's Carex. E. B. 2910, L. C. 1216. (See "Phytologist," vol. iii., pp. 1061-4.) Stem erect, *angular*, striated, rough above, leafy, two feet high. Leaves long, *flat*, narrow, lower smooth, upper rough, all furrowed. Spikelets numerous, *upper ones male at both ends*, the lower compound and *distant*, the higher simple and crowded, ovate, tapering, the lowermost group subtended by a long, leaf-like bract, the second by a setaceous, rough, short one, the others without bracts or with mere scales, the common axis (rach) very rough. Scales elliptical, *as long as the fruit.* Fruit tapering, with a serrated beak. Edinburgh, Hertford, Surrey, Pörtsea. Perennial. June.

A. 4, C. 8. Lat. 50°—58°. Alt. 0—200 yards. T. 50°—47°.

C. brizoides, Linn. *Root creeping.* Stem a foot high. Leaves long and narrow. Spikelets five-six, *contiguous, curved, oblong.* Fruit lanceolate, tapering into a cleft beak, serrulate on the edges. Scales pale brown, as long as the fruit. Studley Wood, Yorkshire. Mr. M'Iver. Perennial. June. (?)

Query.—Is *C. brizoides* a variety of *C. curta* or of *C. ovalis*?

17. **C. axillaris**, Good. Axillary Clustered Carex. E. B. 993, L. C. 1215. Root strongly fibrous, the upper part of it invested with numerous brown, hair-like fibres. Stems erect, round and leafy below, naked, *angular* and rough above, leaves *flat*, lower short, with a prominent ligule, upper longer, with long sharp points. Spikelets numerous, the upper crowded, and *male at both ends*, the lower *distant and aggregate ovate*, tapering, bracteate, the lower group with a very

long, triangular, setaceous bract, the upper ones much shorter. Scales ovate, *shorter than the fruit*. Fruit oval, with a longish, slightly serrated, cleft beak. Rare. Norfolk, Essex, and Surrey. Perennial. June. (See "Phytologist, vol. iii., pp. 1064.)

A. 8, C. 15. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

§ 3. Base of the spikelets bearing barren florets, upper part fertile ones.

18. **C. remota**, Linn. Remote Carex. E. B. 832, L. C. 1214. Root tufted, stem slender, leafy, smooth and roundish below, naked, angular, and rough above. Leaves narrow, very long, channelled. Spikelets simple, *five-seven, distant, the three or four lower ones subtended by long leaf-like bracts, which surmount the stem*, the others destitute of bracts? Scales ovate-oblong, acuminate. Fruit ovate-oblong, tapering, flat on one side, convex on the other (*plano-convex*), with a cloven beak. Ditches; under hedges and shady places. Perennial. May.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

"*C. axillaris* seems to be distinguished from *C. remota* chiefly by the lowermost spikelet being compound and subtended by a long leaf-like bract, extending beyond the spike, the bracts of the other spikelets being shorter, whilst in *C. remota* the bracts of the three lowermost spikelets which are simple, all extend beyond the spike. In *C. axillaris* the perigynium (fruit) is elliptical, attenuated at both ends. . . . The form of the nut in both is nearly alike."—Leighton, in "Shropshire Flora," 452.

C. tenella, Schk. Slender-headed Carex. Root creeping, *stems very slender* (capillary), a span high, erect. Leaves acute, sheathing the lower part of the stem. Spike erect, slender, consisting of three distant bracteated spikelets, *each bearing one or two fertile florets*. Fruit compressed, elliptic oblong, quite smooth, with a longish beak. In a wood by the river Esk, Angushire; very rare. Mr. G. Don. Is anything certain known about the British locality of this plant?

19. **C. elongata**, Linn. Elongated Carex. E. B. 1920, L. C. 1213. Root tufted, with setaceous fibres. Stems several, erect, rather slender, triangular, rough at the edges, leafy, except in the upper part. Leaves numerous, very long, nearly equal, flat, with shortly acuminate points, and large, prominent ridges. Spikelets sessile, numerous, alternate below, and more or less open and crowded above, *divergent*, oblong. Scales scarious at the edges, shorter than the fruit. Fruit *divergent*, smooth, *oblong attenuated*, ribbed both on the flat and convex side, tapering into a *scarcely notched beak*. Rare. Weybridge, Surrey. Mr. H. C. Watson. Perennial. June.

A. 4, C. 6. Lat. 51°—55°. Alt. 0—100 yards. T. 49°—47°.

20. **C. stellulata**, Good. Little Prickly Carex. E. B. 806, L. C. 1209. Root tufted, rather woody. Stems short, slender, slightly angular, nearly smooth. Leaves narrow, sheathing the base of the stem, rough at the points. Spikelets three-five, ovate-roundish, distant, especially the upper ones with a small scarious rarely leaf-like

bract under the lowermost. Scales ovate, pointed. Fruit *spreading, ovate-acuminate*, with a flat *slightly cleft* beak, which is green and rough at the edges. Boggy meadows; common. Perennial. May, June.

A. 18, C. 82. Lat. 50° — 60° . Alt. 2—1000 yards. T. 52° — 37° .

21. **C. curta**, Good. White Carex. E. B. 1386, L. C. 1212. Root slightly creeping. Stem smooth, except above. Leaves erect, narrow, rough, not so long as the stem. Spikelets four-six, alternate, ovate, approximate, the upper crowded, the lower sometimes bracteate. Scales ovate, acute, whitish, with a green, not terminal rib. Fruit broadly *ovate*, rather *tumid, smooth, with a short, notched, rough-edged entire* (?) beak. Seed flattened, elliptical, tipped with the permanent style. In watery meadows; rather rare. Perennial. June.

A. 16, C. 50. Lat. 50° — 58° . Alt. 0—750 yards. T. 51° — 39° .

22. **C. Persoonii**, Sieber. (?) *vitilis*, Fr. L. C. 1212 b. Sieb. Root fibrous. Stem branching at the base, leafy only below, slender, slightly rough above. Leaves flat; sheaths scarious at the top. Spikelets about four, the terminal one the largest, ovate, oblong; the lower one a little open (distant), often with a setaceous bract. Scales scarious, pointed, brown, with a green keel. Fruit *erect, ovate*, with a *cleft, short, rough-edged* beak. Mountainous bogs. Perennial. July, August.

A. 7, C. 15. Lat. 52° — 58° . Alt. 350—1000 yards. T. 42° — 36° .

23. **C. leporina**, Linn. *Lagopina*, Wahl. Hare's Carex. E. B. 2815, L. C. 1210. Root crowned with some setaceous fibres (the ribs of the decayed leaves). (?) Stems leafy and reclining at the base, naked for the greater part of their length, smooth, slender. Leaves numerous, flat, pointed. Spikelets about two-four, crowded, in an ovate, very short spike or head. Scales broad, obtuse, *blackish*, scarious at the margin. Fruit *broadly ovate, brownish, with a tapering entire beak quite smooth*. Dry places. South-west side of Lachin-y-gar, and on Cairntoul, Aberdeenshire. Perennial. August.

A. 1, C. 1. Lat. 56° — 58° . Alt. 1000—1200 yards. T. 34° .

24. **C. ovalis**, Good. Oval-spiked Carex. E. B. 306, L. C. 1211. Root tufted. Stem a foot high, hollow, with rough angles. Leaves sheathing at the base, rough at the margins and midrib, narrow. Spikelets five-six, rather crowded, alternate, erect, ovate, elliptical, soft, each with an ovate scale at the base, the lower one with a short, bristle-shaped, rarely leaf-like bract. Scales ovate-lanceolate, brown. Fruit *ovate-oblong, tapering into a blunt or two-toothed beak, with a membranous toothed or serrulate margin*. Marshes and meadows; common. Perennial. June.

A. 18, C. 81. Lat. 50° — 61° . Alt. 0—500 yards. T. 52° — 41° .

§ 4.—Terminal spike usually with both sterile and fertile flowers; the others with fertile ones only.

25. **C. VahlII**, Schk. Vahl's Carex. Close-bearded Alpine Carex. E. B. 2666, L. C. 1225. Stem triangular, rough at the top. Leaves sheathing at the base, rough at the margins and midrib. Spikelets

(spikes) three-four roundish, aggregate, the terminal one with sterile florets at the base; bract about as long as the spikelets (spikes). Scales *ovate*, acute, dark brown, shorter than the fruit. *Fruit obovate, three-sided*, rough, with minute crystalline prickles, with a short cylindrical beak. Stigmas three. Loch Callater, &c., Braemar. Discovered by Dr. Greville and Dr. Balfour, 1830. Perennial. July.

A. 1, C. 2. Lat. 56° — 57° . Alt. 800—850 yards. T. 39° — 38° .

26. **C. Buxbaumii**, Wahl. *C. canescens*, Linn. Buxbaum's Carex. E. B. 2885, L. C. 1226. Root scaly, with setaceous fibres. Stem three-angled through its whole extent, only slightly rough above, slender, leafy at the base. Leaves all *radical*, flat, grooved and keeled, slightly rough, as long as, or longer than, the stem. *Sheaths connected by net-like filaments* (Bab.). Spikes three-four oblong, sessile, contiguous; the lower ones shortly stalked, rather distant. Lower bract leaf-like. Scales *lanceolate*, black, with a *long point*, shorter than the fruit. Fruit three-sided, *oval, two-toothed, without a beak*. Stigmas three. Loch Neagh, Ireland. "Likely enough to be found in Scotland."—Mr. Watson, in "Cybele," vol. iii., p. 109.

27. **C. atrata**, Linn. Black Carex. E. B. 2044, L. C. 1227. Root tufted, scaly, with stout fibres. Stem stout, sharply triangular, nearly smooth, about eighteen inches high, leafy only at the base. Leaves all radical, broad, tapering, soft, striated with lax sheaths, an abrupt ligule, and a triangular sharp point. Lower bract leaf-like, longer than the spikes. Spikes three-five, the upper crowded, the lower on a stalk about as long as itself, ovate. Scales ovate, acute, black, as long as the fruit. Fruit *broadly elliptical triangular*, compressed, blunt, with a *short, cleft, notched, or entire* beak. Stigmas three. Rocks. Scottish Highlands; Welsh mountains about Llanberis.

A. 3, C. 6. Lat. 53° — 58° . Alt. 800—1300 yards. T. 39° — 34° .

SECT. III.—Sterile and fertile florets in separate spikes. The sterile spikes, one, two, or several. (See Fig. 56, p. 20.)

§ 1.—Bracts membranous, stigmas three.

28. **C. clandestina**, Good. *C. humilis*, "Leyss." Dwarf Silvery Carex. E. B. 2124, L. C. 1254. Root woody, hairy, with stout, wavy fibres. Stems a few inches long, furnished with scarious, not leaf-like bracts. Leaves all radical, tufted, numerous, spreading, more than twice as long as the stems, narrow, channelled, persistent. Bracts *scarious, silvery-white, almost concealing the fertile spikes*. Sterile spikes terminal, acute, with many barren florets; fertile ones *two or three, or few-flowered, concealed in the bracts*. Fruit obovate, triangular, downy at the top. Salisbury Plain; Bristol; St. Vincent's rocks, below the hot wells; Brean Down, Weston-super-Mare. (See "Phytologist," vol. i., p. 299). Perennial. May.

A. 3, C. 4. Lat. 51° — 52° . Alt. 0—200 yards. T. 50° — 48° .

29. **C. digitata**, Linn. Fingered Carex. E. B. 615, L. C. 1255. Roots tufted, hairy, with numerous blackish fibres. Stems erect, slender, slightly angular, quite naked except at the base. Leaves all

radical, flat, rather broad, keeled, with reflexed teeth towards the base, and with erect teeth towards the apex. Barren spikelet scarcely terminal; fertile ones two or three, five-eight-flowered, slightly distant stalked, erect, slender, lax, with a scarious bract, *shorter than the foot-stalk*. Scales reddish, abrupt, with a green midrib. Fruit obovate, three-angled, downy at the apex, with a short entire beak. Limestone rocks. Leigh Woods, Somersetshire; Cleeve Hill, four miles from Cheltenham; and Thorp Arch, Yorkshire. Perennial. May.

A. 5, C. 6. Lat. 51° — 55° . Alt. 0—200 yards. T. 49 — 47° .

§ 2. Barren and fertile florets in separate spikes, barren spikes one, two, or several. Bracts leaf-like, often sheathing. Stigmas two, sometimes three, in *C. rigida*. Fruit oblong or obovate, with an entire, very short, or indistinct beak. Bracts not sheathing, spikes upright.

30. *C. vulgaris*, Fries. *C. caespitosa*, Sm. Tufted Bog Carex. E. B. 1507, L. C. 1228. Root short, forming dense tufts, shooting out oblique rhizomes. Stems slender, angular, rough above. Leaves erect, narrow, equalling or exceeding the stem, with *entire sheaths*. Barren spikes terminal, slender, upright, one large and (rarely?) usually a small one, a few florets of the fertile spikes are barren; fertile spikes nearly sessile. Scales purple, with a green keel, ovate-obtuse or rounded. Fruit *nerved, ovate, blunt*, compressed nearly flat, nerved at the base, with a distinct or indistinct short entire beak. Stigmas two. Marshes and wet shady places. Perennial. May, June.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—1000 yards. T. 52° — 37° .

31. *C. stricta*, Good and Sm. Glauous Straight-leaved Carex. E. B. 914, L. C. 1231. Roots forming immense compact (dense) tufts, which are larger than those of *C. paniculata*. Stems erect, six inches to two feet high, sharply angular, compressed and rough. Leaves radical, not so long as the stem, the outer ones membranous, or *torn into filaments*. Bracts auricled. Lower bract leaf-like, erect, not so long as the spike, the second bract much shorter. Barren spikes two, the terminal one very long, the next one much shorter and slenderer. Fertile spikes about two or three, sessile, cylindric, tapering, with sterile florets usually at the summit. Scales black, lanceolate. Fruit *nerved, oblong, blunt*, compressed, with a short beak, densely arranged in rows. Stigmas two. Marshes and bogs. Perennial. April. *Query*, May?

A. 12, C. 20. Lat. 50° — 56° . Alt. 0—200 yards. T. 51° — 47° .

32. *C. acuta*, Linn. Slender-spiked Carex. E. B. 850, L. C. 1232. Root creeping, with horizontal runners. Stems several, about two feet long, with rough angles, *drooping when in flower, erect in fruit*. Leaves sheathing the base of the stem, erect, drooping at the points, rough, shorter than the stem, sheaths not filamentous. Bracts all leaf-like, without sheaths, all about as long as the spikes, the lower one longer. *Barren spikes two or three*, about as large as the fertile ones; sometimes there is only one. Fertile spikes three-four, sessile or nearly so, often with a few barren florets at the apex. Scales

black ovate-lanceolate, *pointed*. Fruit oblong, compressed, with a distinct entire beak. *Stigmas two*. Ditches, pools, meadows; not uncommon. Perennial. May.

A. 16, C. 60. Lat. 50° — 58° . Alt. 0—200 yards. T. 51° — 47° .

33. **C. aquatilis**, Wahl. Straight-leaved Water Carex. E. B. 2758, L. C. 1230. Root creeping (*throwing out runners* (?), Fries). Stems erect, *with blunt angles*, leafy only below, *smooth*. Leaves with *entire not thready sheaths*, channelled, tapering, erect. Bracts long, leaf-like, not setaceous nor sheathing. Barren spikes terminal, with smaller ones below. Fertile spikes nearly sessile, lower one with a long stalk, lax or few-flowered below, cylindrical elongated, often with sterile florets at the top. Scales elliptical, bluntly pointed, nearly as long as the fruit. Fruit *nerveless*, roundish, obovate with a short entire point. *Stigmas two*. Clova mountains. First discovered in Britain by Mr. Drummond, Drs. Greville and Hooker. Perennial. July.

A. 1, C. 2. Lat. 56° — 58° . Alt. 300—1100 yards. T. 44° — 36° .

34. **C. rigida**, Good. Rigid Carex. E. B. 2047, L. C. 1229. Root strong, scaly, creeping. Stems solitary, erect, or curved, two-fourteen inches, angular, slightly rough above. Leaves numerous, shorter than the stem, broadish, keeled, *with revolute edges*, pointed, slightly recurved, with persistent sheaths. Barren spike terminal; fertile spikes three-four, ovate or cylindrical, the upper one with a few barren florets at the top, nearly sessile, or the lower *stalked*, the lowest only with a leaf-like setaceous bract, the upper spikes with a minute bract or none. Scales dark purple, broad, blunt, nearly as long as the fruit. Fruit *nerveless*, *broadly elliptical*, blunt, compressed with a *short black beak*. In Alpine places. Perennial. June.

A. 10, C. 25. Lat. 53° — 61° . Alt. 500—1300 yards. T. 41° — 34° .

§ 3. Bracts not sheathing; spikes drooping when in fruit; fruit elliptical, with a very short beak.

35. **C. rariflora**, Sm. Loose-flowered Alpine Carex. E. B. 2516, L. C. 1245. Root creeping. Stem erect, naked, leafy only at the base. Leaves glaucous tufted, short, channelled, flat, with filamentous sheaths. Barren spikes single, slender. Fertile spikes two-three, not far apart, *lax*, pendulous on stalks nearly as long as themselves; bracts not leaf-like but abrupt, short, downy, rusty scales. Scales ovate, large, blackish. Fruit ovate, compressed, *with a very short, cylindrical, not tapering beak*. Mountains of Clova.

A. 1, C. 3. Lat. 56° — 57° . Alt. 800—1000 yards. T. 39° — 37° .

36. **C. limosa**, Linn. Green and Gold Carex. E. B. 2043, L. C. 1244. Root widely creeping, shooting out leafy runners. Stems slender, angular, rough, erect, of variable height, from a few inches to upwards of a foot, leafy below. Leaves narrow, channelled, shorter than the stem, wrapped in brown, scaly, short sheaths at the base. Barren spike single, fertile two or one on long slender stalks, *ovate or roundish*, *short*, *dense*, pendulous. Scales broad, ovate, keeled, with a sharp point (prolonged midrib), purple, with a green keel. *Fruit*

elliptical triangular, ribbed, tapering into a very short point. Rare in England; not very unfrequent in Scotland. Perennial. June.

A. 12, C. 30. Lat. 51° — 59° . Alt. 0—200 yards. T. 48° — 45° .

Var. β . *C. irrigua*, Sm. Leaves broader, flat; scales purple; fruit more faintly ribbed. North of England, and Scotland. Perennial. June.

37. *C. ustulata*, Wahl. Roots fibrous. Stems erect. Leaves short, broad. Fertile spikes on short stalks, ovate, dense. Bracts membranous. (?) Scales sharp, dark purple, with a pale midrib. Fruit stalked, compressed, rough-edged, with a cloven beak. Ben Lawers. Mr. G. Don. Not observed since his time. Perennial. July.

38. *C. glauca*, Scop. *C. recurva*, Sm. Glaucous Heath Carex. E. B. 1506, L. C. 1250. "Phytologist," vol. iii., p. 1073. Root creeping, scaly. Stem erect, eight-eighteen inches high, slightly angular, smooth. Leaves mostly radical, erect, or recurved, keeled, rough, not above half as long as the stem; the barren leaves are the longest, enveloped at their base with short sheaths, which terminate in a leafy point. Bracts leaf-like, the lower as long or longer than the spikes. Sheaths short, crowned by minute brown auricles. Barren spike often accompanied with one or more smaller ones. Fertile spikes two or three in large forms, cylindrical, on long stalks, drooping, and finally pendulous. Scales ovate, acute, brown, with a green rib and scarious margin. Fruit obovate, blunt, rough, brown or black, with a very short cylindrical point. Wet barren heaths; common. Perennial. May.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—700 yards. T. 52° — 40° .

§ 4. Fruit ovate, or obovate, or rounded; beak very short or none; bracts sheathing.

39. *C. pallescens*, Linn. Pale Carex. E. B. 2185, L. C. 1236. Root large, tufted, fibrous. Stems several, erect, slender, angular, rough and naked at the top, leafy at the base. Leaves erect, flat, about half as long as the stem; the outer, decayed leaves with filamentous sheaths, slightly pubescent, and especially at the top of the sheaths. Bracts leaf-like, sheathing the lower part of the spike-stalks. Barren spike single, oblong-linear, erect; fertile ones about three, more or less distant, not crowded, all on longer or shorter stalks, the lowest on a long stalk, nodding (pendulous), ovate or cylindrical, obtuse, many-flowered. Scales ovate, scarious, ribbed with a long point. Fruit smooth, shining, ovate-oblong, rounded at the apex, without a beak. Meadows and pastures; frequent. Perennial. May.

A. 17, C. 70. Lat. 50° — 59° . Alt. 0—600 yards. T. 51° — 41° .

40. *C. panicea*, Linn. Pink-leaved Carex. E. B. 1505, L. C. 1241. Root creeping. Stem bluntly three-angular, smooth, erect, twelve-eighteen inches high, more or less, depressed or furrowed on one side. Leaves short, broad, rough-edged, very glaucous, sheathing the base of the stem. Bracts leaf-like, not longer than the spikes, with sheathing bases. All the spikes tapering. Fertile spikes usually two, remote, lax, ovate-cylindrical, generally few-flowered.

Scales black, oblong, acute (with a short point and a green keel), shorter than the fruit. Fruit ~~round-obovate acuminate with a short~~

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florets. Scales deciduous, ovate, membranous. Fruit ovate-oblong, chestnut, shining, tipped with a tapering entire beak. Perthshire. Perennial. July.

A. 6, C. 10. Lat. 54°—61°. Alt. 0—900 yards. T. 46°—38°.

§ 6. Fruit ovate-lanceolate, with a short notched beak.

42. **C. strigosa**, Huds. Loose Pendulous Carex. E. B. 994, L. C. 1246. Root fibrous. Stem erect, leafy, slender, about two feet high, smooth, *hollow*. Leaves numerous, *broad*, acuminate, soft, except the edges and midrib, with long sheaths. Barren spike terminal, solitary; *fertile spikes very slender, elongated on foot-stalks which are longer than the sheaths*. Scales lanceolate, scarious, with a green broad midrib, not quite so long as the fruit. Fruit ovate-lanceolate, *tapering at both ends, ribbed, scarcely notched*, without a beak. Seed elliptical, triangular, punctured. In groves and thickets; not common. Perennial. May.

A. 10, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

43. **C. pendula**, Huds. Great Pendulous Carex. E. B. 2315, L. C. 1248. Root tufted, fibrous. Stem tall, above a yard high, leafy, triangular, rough near the top. Leaves large, recurved, rigid, not so long as the stem. Barren spike solitary, cylindrical, elongated; fertile spikes four-six, *cylindrical, elongated*, with long *sheathing bracts which include their foot-stalks*, all pendulous or drooping, distant. Scales ovate and pointed. Fruit green, ovate, oblong, *slightly trian-*

gular, smooth, with a short notched beak. Moist hedges and shady places; not rare. Perennial. May, June.

A. 15, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

§ 7. Fruit ovate; beak as long as the fruit.


44. **C. sylvatica**, Huds. Pendulous Wood Carex. E. B. 995, L. C. 1247. Root tufted, with stout fibres. Stem erect, leafy, triangular, with striated convex sides, about two feet high. Leaves broad, tapering, rough, light green, outer sheaths filamentous. Male spike single, terminal; female about four-five on long, slender, drooping stalks, sheathed about half their length by the leaf-sheaths, lax, slender. Scales ovate, acute. Fruit green, *smooth, oblong, faintly nerved, with a long, cleft beak.* Seed triangular. In woods; common. Perennial. May, June.

A. 15, C. 60. Lat. 50°—58°. Alt. 0—800 yards. T. 51°—40°.

45. **C. depauperata**, Good. Starved Wood Carex. E. B. 1098, L. C. 1242. Root somewhat creeping. Stem slender, obscurely angled, smooth, nearly two feet long. Leaves mostly radical, flat, narrow, soft, not so long as the stem. Barren spike terminal, solitary, with a small bract; fertile spikes about four, the lower on long stalks, the upper on shorter ones, all furnished with long, leaf-like bracts which cover about a third part of the stalk, *few-flowered.* Scales scarious, with a broad nerve. Fruit erect, *large, roundish, turgid with a long, rough, cleft beak.* Seed (nut) triangular, with blunt angles. Dry woods; rare. Perennial. May. Godalming, Surrey; and Charlton, Kent.

A. 1, C. 2. Lat. 51°—52°. Alt. 0.—100 yards. T. 49°.

§ 8. Fruit ovate-lanceolate, with a deeply-cleft beak.

46. **C. Pseudo-cyperus**, Linn. Cyperus-like Carex. E. B. 242, L. C. 1249. Roots fibrous, tufted. Stems erect, sharply angular, rough, one or two feet high. Leaves mostly radical, sheathing the lower part of the stem, the lower very short, the upper not so long as the stem, all broad, flat, tapering, and pointed, very rough at the margins and keel. Lower bract much overtopping the spikes, with a long sheath and scarious ligule; upper bracts with short sheaths, terminating in long rough awns or bristles, all with rough ribs and margins. Barren spike slender; fertile spikes three-four, on long, angular, rough pedicels, pendulous, close together, except occasionally when the lower one is remote, cylindrical, one or two inches long. Scales ovate at the base, very long, tapering, subulate, rough. *Fruit reflexed, when mature, curved, (?) ovate-lanceolate, strongly ribbed, attenuated into a long deeply-cleft (two-horned) beak.* Ditches, banks, and ponds, in woods. Perennial. June. *d.* 

§ 9. Fruit angular, with a cleft beak which is shorter than the fruit.

47. **C. fulva**, Good. Tawny Carex. E. B. 1295, L. C. 1237. Root tufted, creeping. Stem erect, or nearly so, slender, smooth, slightly rough at the summit. Leaves erect, flat, striated, rather

rough and rigid, much shorter than the stem; radical leaves longer, with filamentous sheaths, keeled. Spikes distant; barren one slender, rarely with a small one at its base; fertile spikes two, cylindrical, ovate, short, on longish stalks, *nearly concealed by the sheathing, leaf-like bracts*. Scales membranous with a strong rib, toothed or serrulate near the summit. *Fruit ovate, angular, ribbed with a straight, rough, cleft beak*. ("Phytologist," vol. i., p. 924.) Seed (nut) roundish, large. In boggy meadows; not uncommon (near the sea). Perennial. June.

Var. *β. speirostachya*, Sm. Leaves chiefly radical, sheathing, outer sheaths filamentous, not half so long as the stem; stem leaves short, flat, with long sheaths. Barren spike terminal, solitary; fertile spikes oblong, about two, distant, stalked; bracts covering with their sheaths about two-thirds of the stalks. Scales lanceolate, not sharply-pointed. Fruit triangular, ribbed, with a longish, deeply-cleft beak. The form above described is from Great Doward Hill, Herefordshire. Communicated by Mr. B. Watkins. Perennial. July. *β.* is the commoner form.

A. 18, C. 70. Lat. 50°—61°. Alt. 0—650 yards. T. 51°—40°.

48. *C. flava*, Linn. Yellow Carex. E. B. 1294, L. C. 1234. Root fibrous, tufted. Stems tufted, erect, nearly a foot high, angular, smooth, except near the top, leafy at the base. Leaves rather broad, flat (keeled); erect, rough, with two prominent rough lines on the upper side near the point. Barren spike mostly single; fertile two or three, all erect, ovate-roundish, sessile, the lower one stalked; bracts leaf-like, the upper ones spreading with very short sheaths. Scales ovate, acute, tawny, with a green rib nearly as long as the fruit. *Fruit ovate, turgid, smooth, ribbed, with a rough-edged cleft beak, which has a downward curve*. Seed (nut) triangular, black. In boggy meadows; common. Perennial. May.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—1000 yards. T. 52°—37°.

Var. *β. Oederi*, Sm. E. B. 1773. Spikes close together with a

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drical, the lower on long stalks and drooping when ripe. Lower bracts leaf-like, with long sheaths, uppermost only a scale-like awn; all the sheaths with a wide ligule. Fruit ovate, triangular, with convex sides, smooth, ribbed, *tapering into a cloven beak*, rather longer than the tapering, sharp-pointed, green and shining scale. Moist woods near Godalming. Mr. J. D. Salmon. Perennial. June.

A. 13, C. 30. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—45°.

51. **C. distans**, Linn. Loose Carex. E. B. 1234, L. C. 1238. Root fibrous, scarcely creeping. Stems twelve-eighteen inches high, weak, smooth, except at the very summit, leafy at the base. Leaves flat, broad, short, tapering. Barren spike erect, cylindrical, blunt, longer than the others; fertile spikes two or three, with a long interval between the lower two, *elliptic-oblong* on stalks, mostly enclosed in the sheaths of the leafy narrow bracts. Scales pointed, with an awn. Fruit ovate-triangular, equally ribbed with a short cleft beak. Pastures near the sea. Perennial. May, June.

"Are not *C. fulva* and *C. distans* simply forms of one and the same species?"—Dr. Bromfield, in "Phytologist," vol. iii., p. 1067.

A. 15, C. 50. Lat. 50°—59°. Alt. 0. T. 52°—46°.

52. **C. punctata**, Gaud. Stem slender, smooth, leafy. Leaves slightly rough at the margin; sheaths scarcely one-third part of the length of the leaves. Fertile spikes erect, cylindrical-ovate, on peduncles about as long as the sheaths; upper portion of the spikes barren. Outer glumes brownish, pointed. Fruit green, ovate, tumid, with a linear, smooth, forked beak. Cornwall, Jersey, and Guernsey. ("Phytologist," vol. iii., pp. 57, 1068; vol. iv., p. 1095.)

A. 2, C. 3. Lat. 50°—54°. Alt. 0. T. 52°—49°.

53. **C. binervis**, Sm. Green-ribbed Carex. E. B. 1235, L. C. 1239. Root stout, somewhat creeping. Stems usually more than one, firm, erect, with blunt angles, except at the top, where the corners are sharp and rough, leafy, two-three feet high. Leaves erect, flat, rather broad, tapering into a rough triangular point; root-leaves numerous, short, none of the leaves so long as the stem. Barren spike single, (?) cylindrical, tapering. Fertile spikes about three, very distant, the lower two generally compound at the base, and on long stalks, which are more than half concealed by the sheaths of the bracts. Upper bracts very minute, only forming scarious or callous tips to the slightly slit sheath. Scales blackish, with a strong rib which is prolonged into a point. Fruit brown, concave on one face and convex on the other, *with two prominent green ribs* near the margin. ("Phytologist," vol. iii., pp. 1069.) On dry heaths; common on the driest moors in Scotland. Perennial. June.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—1050 yards. T. 52°—36°.

§ 10. Fruit more or less downy or hairy.

54. **C. præcox**, Jacq. Vernal Carex. E. B. 1099, L. C. 1251. Root branching and *creeping*, emitting leafy shoots. Stems oblique, three-ten inches high, firm, angular, leafy at the base. Leaves harsh, in short close tufts, spreading or recurved, flattish and pointed, rough.

Barren spike single, elongated, enlarged above. Fertile spikes usually two, *close*, on short pedicels, covered by the short sheaths of the bracts. Bracts very narrow, erect, often wanting. Scales brown, with a green rib, which is prolonged into a point. Fruit *downy*, *ovate*, *pear-shaped*, with a *short conical*, *abrupt*, *entire*, *brown tip*.

A. 18, C. 75. Lat. 50° — 61° . Alt. 0—400 yards. T. 52° — 44° .

55. **C. montana**, Linn. Mountain Carex. L. C. 1251*. Root tufted, scarcely creeping, *woody*, with wavy fibres and fibrils. Stems slender, almost smooth, leafy only at the base. Leaves radical, narrow, soft, with rough edges, mostly shorter than the stem, the lower (outer) with reddish, mostly filamentous sheaths. Bracts not sheathing, ending in long awn-like points. Barren spike single, ovate tapering, sometimes with fertile florets at its base. Fertile spikes smaller (one-three sessile, contiguous.) Scales obtuse, with abrupt points, or blunt. Fruit *elongate*, *abovate*, *downy*, with *short entire beak*. In some states, when growing in woods, the leaves are as long or longer than the stem; in open places the leaves are shorter. Sussex, Gloucester, Herefordshire. (See "Phytologist," vol. ii., pp. 289-910; vol. iv., p. 551.) Perennial. May. Rare.

A. 2, C. 3. Lat. 51° — 52° . Alt. 0—(?) . T. 49° .

56. **C. tomentosa**, Linn. Larger Downy-fruited Carex. E. B. 2046, L. C. 1253. Root *obliquely* or *horizontally* creeping. Stems erect; about a foot high. Angular, rough at the summit, leafy below. Leaves flat, ribbed, rough or downy, not so long as the stem. Barren spike single, tapering. Fertile spikes usually two, short, cylindrical, blunt, sessile, or nearly so. Lower bract, with a short sheath, *leaf-like*, as long as the spikes. Scales oval, with prominent rib and point. Fruit *roundish*, *abovate*, triangular, *very downy*, angles almost ciliate, with a *short notched beak*. The only known locality in England is Marston Maisey, Wilts. Perennial. June. The plant described was communicated by Mr. R. Withers.

A. 1, C. 2. Lat. 51° — 52° . Alt. 0—150 yards. T. 49° .

57. **C. hirta**, Linn. Hairy Carex. E. B. 685, L. C. 1257. Root horizontal, widely-creeping and branching, with shaggy radicles. Stem erect, angular, leafy. Leaves erect, flat, hairy or downy, especially on the sheaths. Not so long as the stem. Barren spikes two-three. Fertile ones as many, erect, distant, cylindrical-ovate, stalked; stalks nearly covered by the sheaths of the leaf-like bracts. Scales ovate, keeled, with rough awns. Fruit *ovate*, *turgid*, tawny, *hairy all over*, with a *rough*, *deeply cleft* and *sharp beak*. Watery places; common. Perennial. May.

A. 16, C. 70. Lat. 50° — 58° . Alt. 0. T. 52° — 47° .

Var. β . Female spikes compound. Male ones numerous.

58. **C. pilulifera**, Linn. Round-headed Carex. E. B. 885, L. C. 1252. Root *tufted*, fibres numerous. Usually surmounted by the persistent nerves of the decayed leaves. Stems reclining, angular, nearly smooth, leafy below. Leaves mostly radical, flat, pliant, not so long as the stem, channelled, with long points. Male spike single, slender, pointed. Fertile spikes about three, roundish, sessile,

contiguous, with sheathless, short, setaceous or awn-like bracts. Scales brown, oval, keeled, with a point. Fruit *roundish on a short stalk, with a short cleft beak*, and with a single prominent rib. Boggy heaths; frequent. Perennial. May.

A. 18, C. 75. Lat. 50°—59°. Alt. 0—1100 yards. T. 52°—36°.

59. **C. filiformis**, Linn. Slender-leaved Carex. E. B. 904, L. C. 1256. Root creeping, obliquely or horizontally. Stems slender, erect, slightly angular and rough at the top, about two feet high. *Leaves narrow, channelled*, or involute, rounded behind, nearly as long as the stem, with open sheaths (edges not united). Barren spikes one-three, linear or enlarged above. Fertile spikes two-three, erect, distant, cylindrical, or ovate, shorter than the male spikes. Scales ovate, brown, with a terminal awn. *Fruit erect, ovate, turgid, hairy, with a broad cleft beak*. Boggy meadows; rare. Perennial. June.

A. 13, C. 25. Lat. 52°—59°. Alt. 0—200 yards. T. 49°—43°.

§. 11. Fruit smooth, more or less inflated.

60. **C. ampullacea**, Good. Slender-beaked Bottle Carex. E. B. 780, L. C. 1258. Root creeping. Stem erect, *bluntly angular*, smooth except at the top. Leaves erect, narrow, rough at the edges and keel near the tip, *glaucous, channelled*. Bracts leaf-like, not sheathing, except the lowest be slightly so, very narrow, longer than the spikes. Barren spikes, two-three, slender, with yellowish scales. Fertile spikes, two-three, erect or pendulous, distant, cylindrical, stalked. Scales yellow, narrow, pointed. Fruit crowded, *roundish, inflated*, ribbed, yellowish, and tapering abruptly into a linear, compressed, shortly cleft beak, much longer than the scale. Not common in the south, but frequent in the north of England and Scotland. In marshes, river sides, and pools. ("Phytologist," vol. iii., pp. 1074, 1086.) Perennial. May.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—800 yards. T. 52°—39°.

61. **C. vesicaria**, Linn. Short-spiked Bladder Carex. E. B. 779, L. C. 1259. Root creeping, obliquely or horizontally. Stems erect, with *acute*, rough angles, leafy. *Leaves flat*, rather narrow, tapering, rough at the edges, *light green*. Bracts not sheathing, leaf-like, longer than the spikes. Barren spikes two-three, linear elongated, with yellowish, rusty, lanceolate scales. Fertile spikes two-three, cylindrical, on short stalks, erect, distant, turgid and pale when ripe. Scales yellow-brown, lanceolate-pointed, with a midrib which does not reach the summit. Fruit crowded, somewhat erect or spreading, *ovate, inflated*, ribbed, yellowish, *shining when ripe, tapering into a long*, compressed, cleft beak. Ditches and wet marshes. (Bot. Gaz., No. 22, Oct. 1850.) Perennial. May.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—46°.

62. **C. saxatilis**, Linn. *C. pulla*, Sm. Good. E. B. 2045, L. C. 1233. Russet Carex. Root creeping, with stout fibres. Stem nearly erect, five-nine inches high, angular, striated, roughish near the top. Leaves all radical, not so long as the stem, broad, tapering, rough at the edges. Male spike single, short. Female ones about three, oblong-

ovate, on short stalks. Lower bract large, leaf-like, with a short sheath or ligule. Scales oval, black, with a whitish line. Fruit *elliptical, slightly inflated, rather compressed, with a short, notched beak*. Stigmas two. (See "Phytologist," vol. i., p. 910.) Ben Lawers, Scotland. Originally discovered by Mr. G. Don, 1789. Perennial. July.

Var. *β. Grahmi*, Boott. Male spikes slender. Fruit larger than in the above. Stem one-two feet high. ("See "Phytologist," as above.)

A. 3, C. 9. Lat. 56°—59°. Alt. 850—1050 yards. T. 38°—36°.(?)

63. *C. paludosa*, Good. Lesser Common Carex. E. B. 807, L. C. 1260. Root creeping, obliquely or horizontally. Stems erect with rough acute angles and ribbed sides. Leaves large, flat, glaucous. Bracts not sheathing, leaf-like, equal to or overtopping the spikes. Barren spikes two-three, cylindrical, tapering. Fertile spikes, two-three, about as large as the sterile ones, but thicker, more apart, and on very short stalks. *Scales of male flowers blunt*. Fruit crowded, erect, ovate or oblong, slightly angular, compressed, ribbed, terminating in a *short, sharp*, more or less cleft beak, longer than the scale. Boggy meadows, banks of rivers, ditches and pools; common. Perennial. May, June.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

Var. *β. Kochiana*. Scales longer than the fruit.

C. paludosa may be distinguished from *C. acuta* by its three stigmas and the cleft beak of the fruit.

64. *C. riparia*, Curt. Great Common Carex. E. B. 579, L. C. 1261. ("Phytologist," vol. iii., p. 146.) Root creeping widely. Stem a yard high, stout, erect, with three acute, rough angles. Leaves very glaucous, broad, erect, rough, rigid. Bracts leaf-like, shortly sheathing, the lowest one only as long as the spikes. Barren spikes three-five *triangular, robust*, with brown, pointed scales. Fertile spikes three-four, erect or spreading, the lower on very short stalks, the upper sessile. *Scales lanceolate, acute, tapering, sometimes awned*. Fruit erect, ovate, triangular, with two convex sides, ribbed, and tapering into a short, slightly cleft beak. Banks of rivers and ponds. Perennial. May.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

II. *Elyna*, M. and K. (*Kobresia*, Willd.) Habit like Carex. Spikelets aggregate, two-flowered; the upper barren, the lower fertile; each enclosed in an involute scale, which is sometimes absent. Barren flower, stamens three. Fertile flower, stigmas three on a single style. Fruit bluntly triangular, without an urceolate persistent pericarp like *Carex*.

E. caricina, M. and K. Compound-headed Elyna. E. B. 1410, L. C. 1203. Roots fibrous, tufted. Stems solitary, erect, round, naked except at the base, angular and rough at the top. Leaves radical, spreading or recurved, narrow, channelled, rough, shorter than the stem, with sheaths, and a short membranous ligule. Spikelets

brown, alternate, aggregate, in an ovate, erect spike, with one or two membranous bracts at its base. Moors. Teesdale, Yorkshire. Perennial. July.

A. 3, C. 3. Lat. 54° — 57° . Alt. 60—800 yards. T. 41° — 37° .

TRIBE II.—Scirpæ. THE SCIRPUS TRIBE. Flowers perfect in spikes composed of usually unequal, imbricated scales, the lower scales often barren. Fruit usually surrounded at the base with longer or shorter hairs, which are sometimes few, sometimes numerous.

Genera.—*Rhynchospora*, *Heleocharis*, *Scirpus*, *Cladium*, *Eriophorum*.

SYNOPSIS OF THE GENERA.

Rhynchospora. Flowers in several spikelets. Fruit crowned by the dilated *jointed* style.

Heleocharis. Flowers in a single terminal spike. Fruit crowned by the *conical base* of the style.

Scirpus. Stems bearing one or several spikes (spikelets). Style *not dilated* at the base.

Cladium. Shell (epicarp) of the fruit crustaceous and brittle, distinct from the real fruit (endocarp).

Eriophorum. Fruit subtended by long, *white, cottony hairs*.

III. *Rhynchospora*, Vahl. Beak Rush. Root tufted, or creeping. Stems leafy. Spikelets more or less numerous, in terminal or lateral *roundish clusters*. Lower scales barren, smaller than the upper; only two-three of the latter fertile. Stigmas two. Fruit convex on both sides, with from six-twelve hairs, shorter than the scale, crowned with the persistent, *enlarged, jointed style*.

1. ***R. alba*, Vahl.** White Beak Rush. E. B. 985, L. C. 1180. Roots tufted. Stems slender, angular, striated, smooth. Leaves narrow, keeled. Spikelets white, oblong, pointed, aggregated in roundish stalked clusters, either in pairs or in threes, with small bracts. Bristles under the fruit ten-thirteen, rough, *with teeth pointing downwards*. Peaty bogs on barren heaths; not uncommon. Perennial. June, July.

A. 18, C. 60. Lat. 50° — 61° . Alt. 0—200 yards. T. 52° — 45° .

2. ***R. fusca*, Sm.** Brown Beak Rush. E. B. 1575, L. C. 1181. Root creeping. Stems erect, slender, angular, striated. Leaves filiform, keeled. Spikelets brown, oblong, aggregated in roundish or ovate clusters, usually two, rarely three; one lateral and one terminal, or two lateral and one terminal, subtended by leaf-like bracts, which far exceed the clusters. Bristles at the base five-six, rough, *with teeth directed upwards*. Goss Moor, Bodmin, Cornwall. Perennial. June.

A. 3, C. 5. Lat. 50° — 52° . Alt. 0—50 yards. T. 52° — 50° .

IV. *Heleocharis*, Br. Spike Rush. Root tufted or creeping. Stems leafless, with several membranous sheaths at their base. Spike *solitary, terminal*. Lower scales of the spike larger than the upper, one or two of the lowermost barren. Stigmas two-three. Fruit com-

pressed, angular (lenticular) or triangular. Bristles three-six, shorter than the scales, rarely absent; crowned by the base of the *dilated* persistent style.

1. **H. palustris**, Br. Creeping Spike Rush. E. B. 131, L. C. 1192. *Scirpus palustris*, Linn. *Root creeping*, with long horizontal rhizomes. Stems tufted, erect, six-twentyfour inches long, as thick as a crow-quill, cylindrical-compressed, with two-three reddish, close sheaths at the base. Spike oblong, many-flowered, with pointed scales, the two lower greenish, *barren, each one-half embracing the base of the spike. Margins of scales broadly membranous.* Stigmas two. Fruit yellow, smooth, obovate-pear-shaped, *slightly compressed, with rounded margins.* Bristles four-six, rough, with deflexed teeth, rather longer than the fruit. In wet places; very common. Perennial. June.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—43°.

2. **H. uniglumis**, Rchb. *Scirpus uniglumis*, Link. L. C. 1192*. *Root creeping*, with horizontal or oblique rhizomes. Stems several, erect, three-eighteen inches high. Sheathing scales purplish, blunt. Spikes oblong, more or less pointed. Scales black, pointed, narrowly membranous; the lower scale barren, almost surrounding the base of the spike. Stigmas two. Fruit smooth, obovate (pear-shaped), *slightly compressed with blunt edges.* Bristles four-six, persistent, with deflexed teeth, usually *longer* than the fruit. Wet sandy places. Perennial. June, July.

Range probably the same as that of *S. multicaulis*, from which it is supposed by some good botanists to be undistinguishable.

3. **H. multicaulis**, Sm., Eng. Fl. Many-stalked Spike Rush. E. B. 1187, L. C. 1193. *Root tufted.* Stems slenderer than in the preceding, several, from eight-twelve inches long, with one or two close purplish sheaths at the base. Spike oblong, slenderer, more pointed and darker than in *H. palustris*. Scales *broadly membranous*, blunt, scarious at the margin and tip, the lower one *green*, and embracing the base of the spike; one or two of the lower florets often viviparous. Stigmas three. Fruit obovate, *triangular, with one side flat*, and with a triangular beak or point. Bristles four-six, peristent, rather shorter than the fruit. Turfy bogs and wet commons. Perennial. July.

A. 18, C. 70. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

4. **H. Watsoni**, Bab. L. C. 1193*. Babington, in "Transactions of Edinburgh Bot. Soc.," June 10, 1852. Stalks (culms) sheathed at the base; sheaths abruptly truncate. Spikes oblong, terminal, solitary. Lowest glume (scale) blunt, and surrounding the base of the spike. Style cleft, with a broadly depressed persistent base. Fruit (achene) convex on both sides, oblong, very obtuse, angles rounded and obscurely punctate, striated, with a slightly attenuated base; four-six hypogynous setæ, which are shorter than the fruit. ("Phytologist," vol. iv., pp. 625, 651.)

"Collected by Professor Balfour, at Taynlone, in Cantyre, along with *Scirpus pauciflorus*, in the autumn of 1844. Among specimens of the latter plant transmitted by Dr. Balfour, Mr. H. C. Watson recently detected the above-noticed new species."

5. **H. acicularis**, Linn. Least Spike Rush. E. B. 749, L. C. 1197. Root tufted, with slender horizontal rhizomes, which produce other individual plants. Stems tufted, erect, very slender, four-angled, two to six inches long. Sheaths more or less red, scarious, close. Several stems barren. Spikes five-ten-flowered, slender ovate, pointed. Scales brown, sharp, with a membranous edge. Stigmas three. Fruit *whitish, oblong, furrowed* with transverse lines, slightly angular, with a small blunt beak. Bristles (?) (two-six) caducous or absent. In wet places and edges of ponds on heaths. Perennial. July.

A. 15, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

V. Scirpus, Linn. Club-Rush, Bull-Rush. Root tufted or creeping. Stems simple, rarely branching, leafy or leafless, in the latter case with scaly or membranous sheaths at their base. *Spikes* either solitary, or more or less aggregate in clusters or corymbs, *terminal or lateral*. One or two lower scales of the spike barren and larger than the upper. Stigmas two-three. Fruit compressed-lenticular or triangular, with bristles at the base, shorter than the scale (bristles sometimes absent), either blunt or crowned with the persistent base of the *not-dilated* style.

SECT. I.—Spikes solitary, terminal.

1. **S. cæspitosus**, Linn. Scaly-stalked Club-Rush. E. B. 1029, L. C. 1196. Root tufted, dense, surmounted with the dry persistent sheaths of former leaves, fibres tough, zigzag. Stems several, tufted, with very short, pointed, long-sheathing leaves, and several tumid scales. Spike solitary, three-seven-flowered, ovate or ovate-oblong. Scales *ovate, pointed*, outer ones as long as the spike, embracing it, and terminating in a long leaf-like point. Stigmas three. Fruit obovate-oblong, triangular, pointed. Bristles *six, longer than the fruit, with ascending teeth*. On turfy heaths. Perennial. ~~June~~—August.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—1150 yards. T. 50°—35°.

2. **S. pauciflorus**, Lightf. Chocolate-headed Club-Rush. E. B. 1122, L. C. 1194. Root tufted with creeping rhizomes. Stems numerous, tufted, erect, slender, the barren ones longer than the fertile, with an *abrupt leafless sheath at the base* (several of the stems are barren). Spike ovate or oblong, a little longer than the lower scales, few-flowered (two-seven). Scales brown, *blunt*, scarious at the margin, the lower larger than the others, above half as long as the spike, the dorsal nerve not reaching the summit. Stigmas three. Fruit obovate, triangular, shining, with a brown point. Bristles three-six, *usually shorter* than the fruit. Moors and mountains; not uncommon. Perennial. June.

A. 16, C. 50. Lat. 50°—58°. Alt. 0—400 yards. T. 52°—42°.

3. **S. fluitans**, Linn. Floating Club-Rush. E. B. 216, L. C. 1198. Root tufted. Stem floating or creeping, *branching*, leafy. Leaves tufted, channelled, those under water longest and very slender. Spikelets single, terminating the branches, ovate, three-seven-flowered.

Scales green, blunt, the lower two embracing and almost equalling the spike. Stigmas two. Fruit ovate-oblong, compressed, with a very small point. *Bristles rudimentary or absent.* Shallow pools; on heaths and commons, not unfrequent. Perennial. June.

A. 17, C. 50. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

4. **S. parvulus**, R. and S. L. C. 1195. Root fibrous, with very slender rhizomes. Stems about an inch high, round, with a close sheath. *Leaves radical, dilated at the base and embracing the stem,* very slender. Spikes solitary, ovate, few-flowered. Scales ovate, blunt, the lower two larger. Fruit obovate, smooth, with a point. *Bristles much longer than the fruit,* rough, with deflexed teeth. On a mud-flat, near Lymington, Hants; the Rev. G. E. Smith. Annual. July. Extinct. (?) ("Cybele," vol. iii., p. 78.)

SECT. II.—Spikes two or more, rarely solitary by abortion, lateral, or apparently so.

5. **S. setaceus**, Linn. Bristle-stalked Club-Rush. E. B. 1693. L. C. 1186. Roots tufted, fibrous. Stems tufted, very slender, round, erect, or nearly so, leafy at the base. Leaves short, with a membranous, scarious sheath, which is terminated by two setaceous teeth. Spikes two, terminal, only apparently lateral, with a leaf- or hair-like sheathing bract, ovate, contiguous. Scales brownish, with a green midrib, tapering into a sharp point. Stigmas three. *Fruit triangular,* obovate, with a short point, and *longitudinal ribs.* Bristles absent. Wet, sandy, and gravelly places. Perennial. (?) July.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—400 yards. T. 52°—43°.

6. **S. Savii**, Spreng. Savi's Club-Rush. E. B. 2782, L. C. 1187. Root consisting of a few small fibres. Stems several, very slender, round, leafy at the base, with scarious, but not close sheaths. Spikes one-two ovate, shorter than the leaf-like bract. Scales oval or roundish, with a short point. *Fruit roundish,* without sharp angles, with a short beak (the remains of the persistent style), and *rough with elevated points.* (Hooker.) Bristles absent. ("Phytologist," vol. iii., pp. 865-6.) Sea-coast. Linton, Devon. Under the cliff at Shanklin, Isle of Wight. (Dr. Bromfield, in "Phytologist," vol. ii., p. 516, and in "Fl. Vectensis," p. 544.) Communicated by Mr. Withers, 1849. Perennial. (?) July.

Var. β . *Monostachys*. Spike solitary, with a shorter bract.

A. 8, C. 25. Lat. 50°—56°. Alt. 0—. (?) T. 52°—48°.

7. **S. Holoschoenus**, Linn. Round Cluster-headed Club-Rush. E. B. 1612, L. C. 1185. Root tufted. Stems round, stout, rush-like, three-four feet high. Leaves round, sharp, *with a white furrow on the upper side.* Spikes in dense, round, stalked, rarely sessile heads, of a variable number (from one to ten.) Lower bract leaf-like, long, erect, round and tapering like the stem. Scales obovate, keeled, fringed, variegated. Fruit? Stigmas three. Sandy sea-shores, south of England; rare. Perennial. September.

A. 1, C. 2. Lat. 51°—52°. Alt. 0. T. 50°.

8. **S. lacustris**, Linn. Bull-Rush. E. B. 666, L. C. 1184. Root

large, creeping, with numerous fibres. Stems often half an inch in diameter at the base, and two-three yards long, round, tapering with membranous sheaths at the base, the upper sheaths elongated, rarely *leaf-like*. Spikes terminal from the same point, on long or short pedicels or sessile (the longer pedicels branching), oblong, soft, with a general leaf-like bract, and partial scarious ones. Scales brown, scarious, notched, with a point (the prolonged midrib) somewhat ciliated. Fruit obovate, obscurely angular, smooth with a point, flat on one side. Bristles three-six, as long as the fruit. Rivers, lakes, ponds. Perennial. May, June.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

Var. *S. glaucus*, Sm. E. B. 2321, L. C. 1184, var. β . Bract glaucous, short. Scales *rough*, stigmas two. Fruit convex on both sides. Salt marshes. Perennial. August.

9. *S. carinatus*, Sm. Blunt-edged Club-Rush. E. B. 1983, L. C. 1184*. Root thick, with many fibres, creeping as in *S. lacustris*. Stem slenderer than the last described species, and slightly *triangular above with convex sides*, and scarious sheaths at the base. Panicle smaller than in the preceding, with a short furrowed bract. Spikes ovate-oblong. Scales scarious, ciliate, and torn. Fruit in the species growing on the margin of the Thames imperfect. Rivers Thames and Arun. Perennial. July.

A. 2, C. 4. Lat. 50°—52°. Alt. 0. T. 51°—49°.

10. *S. triquet*, Linn. Triangular Club-Rush. E. B. 1694, L. C. 1188. Root creeping, tufted. Stems two-three feet long, *acutely-triangular*, with a short, spreading, long-sheathed leaf. Spikes mostly sessile, with a longish bract which appears like a prolongation of the stem, and the cluster of spikes is rather lateral than terminal. Scales elliptical, fringed, and pointed. Fruit roundish, smooth. Bristles three, rough, alternate with the stamens. Rivers Thames and Arun. Perennial. July.

A. 2, C. 3. Lat. 50°—52°. Alt. 0. T. 51°—49°.

It was till recently plentiful in the Thames, opposite Battersea Fields. It has now nearly disappeared in this locality.

11. *S. Rothii*, Hoppe. *S. pungens*, Vahl. Roth's Club-Rush. E. B. 2819, L. C. 1189. *Scirpus pungens*, Vahl. β . Sm. Stem as in *S. triquet*, but slenderer and shorter. Spikes *few, sessile*, large, ovate; lower bract very long and rigid; lobes of the scales acute. St. Ouen's Pond, Jersey. Perennial. June.

Note.—"Long considered a variety of *S. triquet*, which it much resembles in general aspect, while it may be truly distinct."—Mr. Watson, in "Cybele," vol. iii., p. 74.

SECT. III.—Panicle leafy.

12. *S. maritimus*, Linn. Salt-marsh Club-Rush. E. B. 542, L. C. 1190. Root creeping, sometimes knotty. Stem one-three feet high, striated, triangular, with rough angles, leafy. *Leaves sheathing*, keeled, rough, and tapering, pointed. Spikes ovate, aggregate, sessile or stalked, sometimes elongated and cylindrical. Lower bracts large,

leaf-like; upper ones much smaller. *Scales membranous*, split, with sharp lobes, brown, awned, often downy. Fruit obovate, triangular, smooth. Salt marshes. Perennial. July.

A. 17, C. 50. Lat. 50°—58°. Alt. 0. T. 52°—47°.

Still found in the Thames above Battersea.

13. *S. sylvaticus*, Linn. Wood Club-Rush. E. B. 919, L. C. 1191. Root creeping. Stem erect, stout, triangular, leafy. Leaves numerous, flat, broad, tapering, rough at the edges and keel. Panicle very large, on longer or shorter diverging branches, subtended by two *large leaf-like bracts*; branches much divided, primary and secondary branches bracteate. Spikes small, few-flowered, sessile or stalked. Scales blunt. Fruit obovate, slightly triangular. Damp places in woods and hedges; uncommon. In a wood near Hampstead. Perennial. June.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

SECT. IV.—Spikes terminal in two rows, sessile. Bract single, leaf-like, flat, channelled.

14. *S. compressus*, Pers. *Blysmus compressus*, Panz. Compressed Club-Rush. E. B. 791, L. C. 1182. Root with creeping rhizomes. Stem leafy, *triangular*, and naked above. Leaves *flattish*, sheathing, keeled, sharp, rough towards the end, slightly channelled, nearly as long as the stem. Bract solitary, leafy, or scarious at the base, longer than the spikes. Spikes *ten-twenty*, sessile, on a common axis. Scales lanceolate, pointed, sometimes awned. Fruit brown, obovate-oblong, compressed, terminated by the persistent style. Bristles rough, three-six, longer than the fruit, *with deflexed teeth*. Boggy places. Perennial. July.

A. 12, C. 30. Lat. 50°—56°. Alt. 0—400 yards. T. 50°—44°.

15. *S. rufus*, Schrad. *B. rufus*, Link. Brown Club-Rush. E. B. 1010, L. C. 1183. Root creeping. Stems tufted, *round*, smooth, naked, except at the base. Leaves *short*, with long sheaths. Spikes imperfectly two-rowed, *five-ten*, rusty brown. Bract leaf-like, sometimes absent. Scales smooth, scarious; the lower one barren, and as long as the spike. Fruit *elliptical*, tapering at both ends, with a short beak and very short stalk. Bristles. Smith says, "*without any bristles at the base.*" "*Bristles one-six, slender, deciduous, with patent or ascending teeth.*"—Babington. In marshes near the sea on the Western coasts. Perennial. August.

A. 10, C. 30. Lat. 53°—61°. Alt. 0. T. 49°—45°.

VI. *Cladium*, P. B. Twig-Rush. Root creeping. Stems leafy, rigid. Spikes numerous, roundish, aggregate, panicle, pedicelled, or sessile, terminal, and lateral. Spikelets ovate-roundish, the lower scales barren, the upper one or two fertile. Stigmas two-three. Fruit ovate-acuminate, *crustaceous*, brittle, shining. Seed *woody, ovate, tipped with the style*.

C. *Mariscus*, R. Br. Prickly Twig-Rush. E. B. 950, L. C. 1178. Root widely creeping. Stem tall, robust, erect, round, angular at the

(Links of Aberdeen)

top, leafy throughout. Leaves rigid, flat, keeled, with very sharp serrated teeth; sheaths lax. Panicles terminal and lateral, composed of ovate-oblong spikelets, in sessile, or stalked, roundish heads (spikes). Spikelets mostly two-flowered, surrounded at the base by many scarious scales. Fenny parts near the sea. Perennial. July.

A. 14, C. 25. Lat. 50°—59°. Alt. 0—100 yards. T. 52°—46°.

VII. *Eriophorum*, Linn. Cotton Grass. Root with strong oblique fibres or rhizomes, rarely tufted. Stems leafy, rarely naked, erect, simple. Leaves sheathing. Spikes one or several, unequally stalked, usually nodding (inclining), aggregate, or solitary. Scales equal, the lower ones sometimes barren, pointed, not awned. Style elongated. Stigmas three. Fruit slightly triangular, blunt, or with a very short point (the remains of the persistent not enlarged style), furnished with very *copious, long, white, cottony hairs*, which are many times longer than the scales, and growing after the flowering of the plant.

SECT I.—Spike solitary and terminal.

1. ***E. vaginatum*, Linn.** Hare's-tail Cotton Grass. E. B. 873, L. C. 1199. Root tufted, slightly creeping. Stems tufted, smooth, with one or more sheaths, dilated at the summit. Leaves radical, rigid, narrow, angular, rough, nearly as long as the stems, simple. Spike terminal, *ovate-oblong*. Scales scarious, silvery, acuminate. Barren, elevated moors. Perennial. March, April.

A. 18, C. 70. Lat. 50°—61°. Alt. 0—1000 yards. T. 50°—37°.

2. ***E. latifolium*, Hoppe.** *E. pubescens*, Sm. Downy-stalked Cotton Grass. E. B. 563, (?) L. C. 1201. Stem erect, leafy, round below, triquetrous above. Leaves flat, broad, rather spreading, shortly triangular at the ends, rough at the margins. Bracts two-three, leaf-like, black, and membranous for about one-third of their length. Peduncles *rough, with teeth directed upwards*. Heads numerous. Scales ovate-pointed. The down has a reddish, silvery hue. Turfy bogs. Perennial. June.

A. 17, C. 60. Lat. 50°—59°. Alt. 0—200 yards. T. 50°—46°.

3. ***E. angustifolium*, Roth.** Common Cotton Grass. E. B. 564, L. C. 1200. Root creeping. Stem slightly triangular, leafy, especially at the base, slender. Leaves flat, narrow, triangular at the summit and sharp, channelled, keeled, slightly rough. Bracts one-three, leaf-like. *Peduncles smooth*. Spikes drooping in seed. Scales ovate, pointed. Turfy wet places; common. Perennial. April.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1150 yards. T. 51°—35°.

β. *E. elegans*. Stem and leaves slenderer than in the form above described. *E. gracile*. E. B. 2402.

γ. *E. elatius*, Koch. Stem taller and stouter, angular above the middle. *E. polystachion*, Sm.

4. ***E. gracile*, Koch.** E. B. 2886, L. C. 1202. Stem slender, slightly angular, leafy, chiefly at the base. Leaves keeled, angular, blunt, scarcely rough. Bracts one or two, short, leaf-like, blunt, stri-

es broad, ovate, scarcely pointed, and boggy places. White Moor Surrey. Mr. Borrer, 1844. This the plant, drained and cultivated. disappear in this its only known

50 yards. T. 49°—47°.

capitatum, E. B. 2387, have not les. The former is distinguished short leaves, single spike, crisp the latter by its round stem, swell-branous scales. Mr. Brown and the bog of Restennet, near Forfar,

E. capitatum was said to have Lawers. See "Phytologist," vol. t this plant has reappeared, about nfriesshire.

es compressed. Scales imbricated equal, the lower ones smaller and with rudimentary ones only.

THE GENERA.

Scales numerous, equal, all fertile. rious at the base. Scales not nume-

ts creeping. Stems leafy. Bracts lucre (whorled bracts). Spikelets equal. Scales uniform, keeled, all base of the spike. Stigmas two-the base, compressed or triangular, the style, smooth.

Cyperus. E. B. 2626, L. C. 1177. with blunt angles, several, two-six leafy at the base. Leaves flat, often led and sheathing. Bracts longer black, oblong, mostly sessile, aggre-heads. Scales ovate-oblong, some-elets numerous, sessile, or nearly so, qual leaf-like bracts. Fruit oblong, ; shorter than the scale. Marshy w, near Parson's Green, Middlesex, eral years ago; and in Peat-pond, r, by Mr. J. D. Salmon, in 1846.

lt. 0—50 yards. T. 49°.

T

Stems several, triangular, smooth with blunt angles
2-bunches high. Leaves nearly radical (sheathing the
keeled with triangular tapering points sharp) Sp
or nearly so, in clusters subtended by 3 unequal le
meadow at Little Chelva (between this & Waltham

Aug 1. Oct.

Self

Note.—This rare plant is still (July 28, 1857) found in Eel Brook Meadow as above stated.

2. **C. longus**, Linn. Sweet Cyperus, English Galingale. E. B. 1309, L. C. 1176. Root creeping, aromatic. *Stems two-three feet long*, erect, triangular. *Leaves* flat, keeled, usually shorter than the stem. Bracts more than three times the length of the corymb. Spikes shining, brown, narrow, elongated, erect, on slender, triangular, sheathed stalks. Scales ovate-oblong, imbricated. Stigmas three. Fruit obovate-oblong, triangular, less than half as long as the scale. South of England and Isle of Wight; rare. Perennial. August, September.

A. 4, C. 7. Lat. 50°—52°. Alt. 0—50 yards. T. 52°—50°.

IX. Schoenus, Linn. Bog-Rush. Root strong, tufted, fibres not creeping. Stems erect, round or angular, leafy chiefly at the base. Bracts dilated and scarious below, embracing the spikes, leaf-like, and angular above. Spikes compressed, in a dense terminal head. Scales six-nine in two rows, the three lowermost smaller and barren. Stigmas three. Fruit triangular, pointed by the persistent base of the style, with one-five short or rudimentary bristles, which are sometimes absent.

S. nigricans, Linn. Black Bog-Rush. E. B. 1121, L. C. 1179. Root strongly fibrous, surmounted with black, shining scales, the debris of decomposed leaves. Stems erect, round. Leaves rigid, narrow, channelled, triangular, shorter than the stem, with brown, shining sheaths. Bracts two, the longer one terminating in a rigid, blunt leaf, twice as long as the spikes. Spikes brownish black, five-twelve, in a terminal dense head. Scales keeled, lanceolate, pointed. Fruit oblong, white and shining. Turfy bogs. Perennial. June.

A. 18, C. 50. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

ORDER XIII.—**JUNCACEÆ**, Juss. THE RUSH FAMILY.

Herbaceous plants, with tufted or creeping roots and tapering stems, which have often a distinct pith. Leaves when present either flat and channelled or fistulous, often wanting or existing only in a rudimentary state as the radical membranous sheaths of some Rushes. Flowers panicled, cymose, spicate or capitate. Perianth scarious or membranous, six-parted. Stamens six or three. Ovary one or three-celled, one or many-seeded. Ovules ascending, attached to the internal angle of the cells, or on the parietal placenta. Fruit a three-valved capsule, with loculicidal dehiscence, sometimes indehiscent, and one-seeded by abortion. Seed erect or ascending, with a membranous shell (testa), and with a terminal or basal appendage.

These plants are intermediate between the foregoing apetalous orders and the petalous orders following. They afford the first example of a whorled perianth in a herbaceous not petalous state. The

British species are generally distinguishable by their tufted or gregarious mode of growth, their tufted or fibrous roots, and by their hollow and jointed or sometimes flat leaves. They are the productions of the colder regions of the globe.



Fig. 115.—1, *Juncus acutiflorus*. 2, Flower expanded, magnified; *p*, perianth; *st*, stamens; *stig*, style and stigma; *o*, ovary. 3, Pistil; *stig*, style, *stlg*, stigma, magnified. 4, Fruit opening. 5, Longitudinal section of the fruit, magnified; *c*, capsule; *s*, seeds; *pl*, placenta. 6, Transverse section of the fruit, showing the three-celled capsule, with the seeds attached to central placenta. 7, Section of seed, magnified; *e*, embryo; *al*, albumen.

SYNOPSIS OF THE GENERA.

Juncus. Leaves more or less cylindrical, smooth. Fruit three-celled, many-seeded.

Luzula. Leaves flat; usually hairy. Fruit one-celled, few-seeded.

I. *Juncus*, Linn. Rush. Root tufted or creeping. Stem simple, either naked or more or less leafy, spongy within, sometimes prickly at the summit. Leaves, when present, smooth, flat, or cylindrical, hollow, with septa. Flowers terminal or apparently lateral, panicled, occasionally somewhat capitate. Sepals six, acute, permanent. Stamens six, sometimes three, inserted on the sepals, not alternate. Anthers oblong, ovary three-celled, three-valved, with central partitions, which bear the seeds. Seeds minute, roundish, attached to the inner edge of the dissepiment. The smooth stems, generally full of pith, the panicled flowers and the three-celled, numerous-seeded fruit distinguish this genus.

SECT. I.—Stem leafless, without joints, scaly at the base. Flowers apparently lateral.

1. ***J. effusus*, Linn.** Soft Rush. E. B. 836, L. C. 1151*. Root slightly creeping. Stems tufted, erect, striated, soft, pliable, with brown, green, not shining scales at their base, pith continuous. Panicle lax, spreading. Sepals finely-pointed, the three outermost with a broad keel, more or less green. Fruit obovate, depressed at the summit, *not pointed*.

Var. *B. compactus*, Leight. Panicle more or less dense, roundish. Wet pastures; common. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—800 yards. T. 52°—39°.

2. ***J. diffusus*, Hoppe.** L. C. 1152*. Root creeping.(?) Stem rigid, finely and faintly striated, with pointed sheaths at the base; pith continuous. Panicle lax, branching erect, with a minute, scarious, pointed bract at the base; the lateral panicles and florets are furnished with similar bracts. Sepals lanceolate, with long points, longer

than the fruit. Fruit shining, *angular, obovate, with a short point*. In wet places. Perennial. July.

A. 8, C. 30. Lat. 50°—57°. Alt. 0—200 yards. T. 50°—47°.

"My impression is, that *J. diffusus* is a sterile variety of *J. effusus*."—Mr. Watson in "*Cybele*," vol. iii., p. 40.

Mr. Ansell, in the "*Phytologist*," vol. ii., p. 663, states that this plant is distinguished from *J. glaucus* by its smooth stem, *with continuous pith*, and by its obovate truncate capsule, which is shorter than the perianth, of a light brown colour, and smaller than that of *J. glaucus*. ("*Phytologist*," vol. ii., pp. 911—941.)

3. ***J. conglomeratus***, Linn. Common Rush. E. B. 835, L. C. 1151. Root creeping horizontally. Stems erect, *striated*, with close, brown, blunt scales, pith continuous. Panicle more or less dense, roundish. Sepals pointed, more or less brown. Stamens only three. Fruit obovate, triangular, *with a small point*. Wet places; common. Perennial. July. These plants are very similar to each other, especially in some of their states. In none of their forms is there any very characteristic difference between them.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—250 yards. T. 52°—44°.

4. ***J. glaucus***, Sibth. Hard Rush. E. B. 665, L. C. 1152. Root creeping, black, with stout fibres. Stems rigid, tough, finely striated (fluted), glaucous, in large tufts, scales at the base shining, brown, partly pointed, pith not continuous. Panicle cymose, with slender branches. Sepals taper-pointed. Fruit *triangular, elliptical, with a short point*. Wet pastures and road-sides; not uncommon. Perennial. June.

A. 14, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

5. ***J. balticus***, Willd. Baltic Rush. E. B. 2621, L. C. 1153. Root creeping widely and horizontally, throwing up stems at equal distances and at right angles to itself. Stems round, not striated, pith continuous. Panicle erect. Florets with broad scarious bracts. Sepals lanceolate, acute, about as long or a little longer than the fruit. Fruit *broadly elliptical, scarcely triangular*, blunt, with a short point. Sea-shore. Perennial. July.

A. 3, C. 8. Lat. 56°—59°. Alt. 0. T. 48°—46°.

6. ***J. filiformis***, Linn. Least Rush. E. B. 1175, L. C. 1150. Root creeping. Stems six-twelve inches long, light green, curved or drooping about the panicle, naked, slender, with two long brown sheaths. Panicle *simple, few-flowered, situated near the middle of the stem*. Flowers pedicelled, single or in pairs, on one branching pedicel, with a tapering bract at the base of the panicle, and a broad, short, scarious bract at the base of each. Sepals lanceolate, acute. Fruit roundish, obovate, with a very short point. Margins of lakes in the north; Derwentwater. Perennial. July.

A. 1, C. 2. Lat. 54°—55°. Alt. 0—150 yards. T. 47°—46°.

SECT. II.—Sheaths leafy. Stems and flowers as in Sect. I.

7. ***J. maritimus***, Sm. Lesser Sharp Sea Rush. E. B. 1725 L. C. 1154. Root fibrous, tufted, (?) deeply penetrating. Stem erect,

slender, leafless and glaucous, one-two feet high. Root-leaves (barren stems) tapering, sharp-pointed. Panicle erect, elongated, lax, with short spinous bracts. Sepals acute, equal, with a membranous border, as long as the fruit. Fruit *oblong, prismatic, not longer than the sepals*. Salt marshes. Perennial. July.

A. 12, C. 40. Lat. 50°—58°. Alt. 0. T. 52°—47°.

8. **J. acutus**, Linn. Great Sharp Sea-Rush. E. B. 1624, L. C. 1155. Root fibrous, tufted, penetrating deeply into the sand. Stems above a yard high, erect, round, rigid, with a sharp point. Panicle compound, repeatedly sub-divided. Bracts pointed, several. Flowers partly capitate (Sm.) Three inner sepals blunt, half as long as the capsules. Stamens broad and short, style very short. Fruit large, *broadly ovate*, brown, pointed, with three blunt angles, *the lower part invested with the withered sepals*. Seeds ovate. Sea-coast, in deep sand. Perennial. July.

A. 5, C. 12. Lat. 50°—53°. Alt. 0. T. 52°—50°.

SECT. III.—Stems leafy. Leaves radical or cauline (stem leaves), never reduced to scales as in the preceding sections. Flowers terminal, never apparently lateral.

§ 1. Flowers solitary.

9. **J. squarrosus**, Linn. ~~Moss Rush~~ *goose-corn* E. B. 933, L. C. 1163. Roots tufted, dense. Stems few, or nearly solitary, *rigid, leafless*, compressed, or slightly angular, about a foot high. Leaves *numerous, all radical, spreading in a rosette-like manner*, narrow, channelled, *rigid*, three-four inches long. Panicle erect, with alternate, bracteated branches, each bearing a few large flowers, more or less distinct, in one or two terminal corymbs. Outer (lower) sepal, *sharp*, inner (higher) *blunt*. Stamens much shorter than the anthers. Fruit large, roundish-oblong, with a point, brown, shining. Barren sandy heaths. Perennial. June.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—1100 yards. T. 52°—36°.

Note.—The stem in this species is not always leafless. There is occasionally a leaf a few inches above the root. In this case, viz., on high mountainous places, the matted radical leaves are not so conspicuous as they are where the situation is less elevated.

10. **J. compressus**, Jacq. Round-fruited Rush. E. B. 934, L. C. 1160. Root creeping horizontally, producing a number of stems, either contiguous or apart. Stems erect, six-twelve inches high, often swelling at the base (Hooker, *J. bulbosus*, Linn.), *leafy below, naked and compressed above*. Leaves flat, slightly channelled, erect. Lower bract leaf-like. Flowers solitary, more or less distant, on slender, angular, corymbose pedicels. Sepals ovate-oblong obtuse. Fruit roundish, with a point, longer than the sepals. Wet marshy places. Perennial. June.

A. 16, C. 70. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

11. **J. cœnosus**, Bich. *J. Gerardi*, Bab. Mud-Rush. E. B. 2680, L. C. 1160 b. Root creeping. Stem compressed with two-three leaves (more leafy than *J. compressus*, Sm.), triangular towards

the summit. Leaves narrow, channelled with long sheaths, which are crowned by two small auricles. Bract about as long as the panicle, which is somewhat cymose. Sepals oblong, with an obtuse, concave, or incurved point, and a three-ribbed keel (Sm.) Carpels ovate, or obovate, or oblong, about as long as the sepals. Abundant in salt marshes and muddy places near the sea. Perennial. June.

A. 17, C. 70. Lat. 50° — 61° . Alt. 0. T. 52° — 45° .

"*J. tenuis*, Willd., is not a very unlikely species to occur in Britain. It should be looked for in Ireland or England rather than in Scotland."—Mr. H. C. Watson, "*Cybele*," vol. iii., p. 48.

J. supinus, Moench. *J. uliginosus*, and *J. subverticillatus*, Sm. E. B. 801. (See No. 21.)

12. *J. bufonius*, Linn. Toad-Rush. E. B. 802, L. C. 1162. Root fibrous. Stems usually numerous, slender, leafy, a few inches long, often spreading at the base. Leaves narrow, setaceous, channelled, erect. Lower bract leaf-like. Flowers distant, rarely in tufts, on short pedicels, with two-three white, pellucid bracts. Sepals narrow, acute, with broad shining margins. Fruit oblong, obtuse, triangular, with a point, much shorter than the sepals. Var. β . *fasciculatus* (Koch.) Stem shorter and thicker. Flowers two-three together. Wet places. Annual. July.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—400 yards. T. 52° — 42° .

§ 2. Flowers solitary or few.

13. *J. castaneus*, Sm. Clustered Alpine-Rush. E. B. 900, L. C. 1164. Root creeping. Stems solitary, erect, round, smooth, nine-twelve inches high, leafy. Leaves erect, convolute, and sheathing at the base, flat, involute when dry. Flowers in terminal heads, usually two, one above the other, with an erect, generally leaf-like bract, longer than the heads, and with short, membranous, partial bracts. Sepals brown, oblong, acute, and membranous at the tips. Fruit oblong, triangular, brown, rounded with a point. In alpine wet places. Perennial. July.

A. 1, C. 4. Lat. 56° — 57° . Alt. 800—1000 yards. T. 39° — 36° .

14. *J. triglumis*, Linn. Three-flowered Rush. E. B. 899, L. C. 1168. Root fibrous, somewhat creeping. Stems several, round, with two or three long-sheathed leaves near the base. "Leaves with dilated sheaths, which are auricled at the top, setaceous, bitubular, with transverse partitions; radical leaves setaceous." (Mr. W. Wilson.) Flowers two-four, in heads, with membranous bracts. Sepals oblong, keeled, membranous at the edges. Fruit elongated, rounded, and tapering at the top, brown. Mountainous bogs. Perennial. July.

A. 8, C. 20. Lat. 53° — 61° . Alt. 350—900 yards. T. 43° — 38° .

15. *J. biglumis*, Linn. Two-flowered Rush. E. B. 988, L. C. 1167. Root fibrous, somewhat creeping. Stems solitary, erect, three-six inches high, somewhat angular, leafy at the base, naked above, and channelled on one side. Leaves radical with transverse partitions, but not divided longitudinally, gradually dilated into a sheathing base. Flowers two, with broad membranous bracts; the lower

bract terminating in a leafy point overtopping the flowers. Flowers terminal, one above another, and turned to one side, by which this is always known from the two-flowered variety of *J. triglumis*, Sm. Sepals blunt. Fruit obovate, depressed at the summit, longer than the sepals. Alpine bogs. Perennial. July.

A. 2, C. 6. Lat. 56°—58°. Alt. 900—1100 yards. T. 38°—36°.

16. *J. trifidus*, Linn. Three-leaved Rush. E. B. 1482, L. C. 1165. Root creeping, bearing numerous involute, scaly, whitish leaves (barren stems), with a few slender stems which are erect and naked except at the base. Leaves all radical, one-two, sheathing, very narrow, channelled, sharp, often wanting. Bracts two-three, leaf-like, dilated at the base, very long. Flowers one-three, sessile or stalked, solitary or aggregate. Sepals sharp, ribbed. Fruit rounded, *tapering, pointed, longer than the sepals*. Mountainous bogs. Perennial. July.

A. 3, C. 10. Lat. 56°—59°. Alt. 550—1400 yards. T. 42°—39°.

§ 3. Flowers in a terminal head, or in two heads, or in panicle heads.

17. *J. capitatus*, Weigel. Dense-headed Rush. E. B. 2644, L. C. 1166. Root fibrous. Stems several or solitary, naked, except at the very base, erect, slender, angular, striated, a few inches high. Leaves radical, very narrow, sheathing, often reddish, one-third part as long as the stem. Flowers in terminal, mostly solitary heads, rarely in two-three heads, contiguous or apart, with one-two leaf-like bracts under each head; upper (interior) bracts membranous, pointed, shorter than the sepals. Sepals *ovate-lanceolate, abruptly pointed, point long, bristly*. Fruit roundish, slightly triangular, pointed, *scarcely half the length of the sepals*. Sandy ground; in Jersey and Guernsey. Annual. June.

A. 1. Lat. 49°—50°. Alt. 0—50. T. 53°—52°.

18. *J. obtusiflorus*, Ehrh. Blunt-flowered Jointed Rush. E. B. 2144, L. C. 1158. Root creeping, with horizontal rhizomes. Stems round, with internal transverse partitions, scaly at the base, and with about two stem-leaves. Leaves hollow, round, tapering, with internal partitions. Lower bract ending in a leaf-like point. Flowers in round heads, four-twelve, in cymes on refracted branches, forming altogether a corymb or terminal panicle. Sepals *oblong, blunt, converging, often purplish*. Fruit *small, ovate-lanceolate, triangular, as long as the sepals*. Marshy places. Perennial. July.

A. 14, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

19. *J. acutiflorus*, Ehrh. Sharp-flowered Jointed Rush. E. B. 2143, L. C. 1156. Root creeping horizontally, sometimes tufted. Stems erect, four-five-jointed, leafy, scaly at the base. Leaves hollow, tapering, flattened, with several partitions, which give them a jointed appearance. Panicle compound, erect, with a leaf-like bract. Flowers in four-ten-flowered heads; heads numerous, in more or less spreading and forked cymes, forming a terminal corymb. Sepals *lanceolate, bristle-pointed, somewhat curved at the apex, the inner longer than the outer*. Fruit *ovate-lanceolate, with three sharp angles, narrowed into*

a long beak, (?) longer than the sepals. Watery places. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—450 yards. T. 52°—42°.

20. *J. lamprocarpus*, Ehrh. Shining-fruited Jointed Rush. E. B. 2143, L. C. 1157. Roots tufted with creeping rhizomes, usually bearing numerous contiguous stems. Stems slightly compressed, jointed, hollow, with a few partitions near the base, erect, or nearly so. Leaves hollow, slightly flattened, with numerous internal, transverse partitions. Lower bract leaf-like. Heads four-twelve-flowered, numerous, on strong, elongated branches, remote, with a very few heads at the forks. Sepals lanceolate, equal, the outer pointed, the inner blunt. Fruit ovate, triangular, abruptly pointed, longer than the sepals. Boggy meadows, watery places. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—800 yards. T. 52°—39°.

Var. *J. nigrifellus*, Don. E. B. 2643, L. C. 1157 b. Stems and leaves scarcely compressed. Clusters (heads) with more flowers than in the preceding form. Fruit more black and glossy than in *J. lamprocarpus*. (Compare "Phytologist," vol. i., p. 96.) Boggy places in the north.

21. *J. supinus*, Moench. *J. uliginosus* and *J. subverticillatus*, Sm. Whorl-headed Rush. E. B. 801, L. C. 1159. Root tufted, or with more or less creeping rhizomes, sometimes floating. Stems more or less numerous, slender, swelling at the base, leafy. Leaves slightly channelled, faintly jointed, radical leaves numerous, dilated at the base, sheathing the bulb of the stem. Lower bract leaf-like, or with a leaf-like point. Flowers few, very variable in position, in lateral or terminal three-twelve-flowered heads. Sepals lanceolate, acute, keeled, blunt or pointed. Fruit oblong, blunt, with a small point, a little longer than the sepals. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—800 yards. T. 52°—39°.

Var. *β. radicans*. Stems prostrate or swimming, very long; bracts and sepals becoming leafy.

Var. *γ. gracilis*. Very slender, heads and flowers much smaller than in the typical form.

Var. *J. verticillatus*, Linn. Knot-Grass. E. B. 895. Stems very slender, filiform, prostrate, branching and flowering from the base. Leaves obovate or roundish, tapering at the base. Flowers in axillary clusters (apparent whorls), more or less distant, often approximate and forming leafy spikes. Calyx smooth, white or whitish pink. Devon and Cornwall. Perennial. July.

J. tenuis, Willd. *J. gesneri*, Sm. Slender-spreading Rush. E. B. 2174. "Stem very slender, a foot or more in height. Leaves few, radical, very narrow, channelled above, dilated and membranous at the base. Bracts two-three, leaf-like, erect; the lower one longer than the panicle, the others much shorter. Panicle forked, of three-four very unequal branches. Sepals tapering, pointed, longer than the roundish fruit." (See *J. canosus*, ante.)

J. alpinus, Vill. Alpine Rush. "Will probably be found in Britain."—Mr. Babington.

II. Luzula, De Can. Wood-Rush. Roots tufted or creeping. Stem round, leafy. Leaves grass-like, mostly radical, fringed with long, unequal hairs. Flowers solitary, or in heads, panicles or cymes. Sepals six, three external and three internal; the latter smaller than the former. Stamens six, with the same attachment as in *Juncus* (on the sepals). Ovary three-angled, *one-celled*, three-valved, *without partitions*. Style deciduous, and stigmas downy; the latter as long as the style. Capsule ovate, three-angled, *one-celled*, *three-valved*, with *three seeds at the bottom of the cell*. Seeds with a tumid crest. The leafy stems broad, often channelled, grass-like leaves, the different aspect of the inflorescence, and, above all, the one-celled, three-seeded capsule, precisely point out this genus as distinct from *Juncus*.

SECT. I.—Flowers solitary.

1. **L. Forsteri**, De Can. Narrow-leaved Hairy Wood-Rush. E. B. 1293, L. C. 1171. Root tufted. Stems slender, about a foot high. Leaves flat, narrow, hairy at the margin; radical ones numerous, tufted, the upper stem-leaves rather larger than the lower. Panicle erect; branches unequal, one-two-three-flowered, *erect when at maturity*. Fruit with three prominent angles and nearly flat sides, with a point. Seed *with a short, blunt, and straight crest*. (Compare "Phytologist," vol. iii., pp. 980—987.) Woods. Perennial. May.

A. 6, C. 20. Lat. 50°—53°. Alt. 0—200 yards. T. 51°—48°.

2. **L. pilosa**, Willd. Broad-leaved Hairy Wood-Rush. E. B. 736, L. C. 1170. Root fibrous, tufted, creeping. Stems slender, leafy. Leaves flat, lanceolate, radical ones tufted, stem-leaves *with long sheaths, densely hairy at the tops*, decreasing in size towards the top of the stem. General bracts several, membranous with leaf-like points, one larger than the others. Partial ones scarious, pointed, shorter than the sepals. Flowers *solitary*, on long, slender, unequal branches, one or two on each, more or less apart; branches *reflexed after flowering*. Sepals acute, keeled, with white scarious margins. Fruit ovate, with three blunt angles. Seeds with a *terminal hooked crest*. Woods. Perennial. April.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—42°.

Compare "Phytologist," vol. iii., pp. 980—987.

3. **L. Borreri**, Bromf. Borrer's Wood-Rush. Stems stouter and rather taller than in either *L. Forsteri* or *L. pilosa*. Leaves rather narrower than in the latter species. Panicle closer than in *L. pilosa*, and more lax than in *L. Forsteri*. Bracts of the calyx broadly ovate, short pointed, with broad scarious margins. Fruit shining, triangular, with blunt angles. Seed? Apre Castle, near Shanklin, Isle of Wight. Discovered by the late Dr. Bromfield. (See "Phytologist," vol. iii., pp. 985, &c.) Perennial. April, May. (?)

SECT. II.—Flowers in heads or spikes.

4. **L. sylvatica**, Bich. Great Wood-Rush. E. B. 737, L. C. 1169. Roots tufted, terminating a stout woody rhizome, which creeps obliquely or horizontally. Stems twelve-eighteen inches high,

leafy. Radical leaves *numerous, tufted, forming a coarse elastic turf*. Stem-leaves small, with very long and tubular sheaths, very hairy. Heads two-four-flowered, numerous, in cymes, forming together a corymb, or terminal panicle, which is longer than the bracts. Sepals bristle-pointed. Filaments much shorter than the anthers. Fruits *ovate, with a point. Seed without a crest*. Woods. Perennial. May.

A. 18, C. 80. Lat. 50° — 61° . Alt. 0—1000 yards. T. 51° — 37° .

5. ***L. campestris***, Willd. Field Wood-Rush. E. B. 672, L. C. 1172. Root creeping and tufted. Stems solitary, six-twelve inches, erect, round, leafy. Radical leaves numerous, narrower and shorter than the stem-leaves, hairy, especially about the top of the sheaths. Bracts two, leaf-like, usually shorter than the spikes, or close panicles. Partial bracts scarious, pointed. Clusters (spikes) more or less dense, in a terminal cyme, on branches which are more or less reflexed when ripe. Sepals lanceolate, keeled, scarious at the margin. Fruit *obovate, rounded, with a short point*, not so long as the sepals. The seeds have *no crest*, except their short thick stalks, running up one side, be considered as such (Sm.) Dry pastures. Perennial. May.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—1000 yards. T. 52° — 37° .

6. ***L. multiflora***, Lej. *L. congesta*, D. C. and Sm. Many-flowered Wood-Rush. E. B. 2718, L. C. 1172*. ("Phytologist, vol. ii., p. 318.) Root tufted. Stems usually leafy, rigid, erect, *much taller than in L. campestris*. Radical leaves numerous, rather broader than the stem-leaves; the latter have long sheaths with a limb diminishing towards the top of the stem. Spikes many-flowered, ovate, *dense, sessile, or pedicelled*, with a very short leaf-like bract; partial bracts scarious. Sepals tapering. Fruit triangular, obovate, with a point. Seed with a conical appendage at the base. Filaments *much longer than in L. campestris*. Marshy turfy ground. Perennial. June.

A. 18, C. 82. Lat. 50° — 60° . Alt. 0—900 yards. T. 51° — 37° .

Var. *a*. Panicle with stalked clusters, branches erect even when in fruit.

Var. *β*. *congesta*, Sm. Clusters sessile, or nearly so, contiguous, in a compact lobed head.

7. ***L. spicata***, D. C. Spiked Wood-Rush. E. B. 1176, L. C. 1174. Roots tufted, bulbous. (?) Stems erect, leafy, about nine-twelve inches high. Radical leaves tufted, short, spreading. Stem-leaves erect, with long sheaths decreasing in size towards the top, larger than the radical leaves. Lower bract leaf-like, scarcely so long as the panicle. Clusters *almost sessile*, in a *close oblong, bending, lobed spike*. Sepals bristle-pointed. Fruit brown, obtuse, with a point. Grassy alpine places. Perennial. July.

A. 6, C. 15. Lat. 53° — 59° . Alt. 550—1450 yards. T. 41° — 32° .

8. ***L. arcuata***, Hook. Curved Mountain Wood-Rush. E. B. 2688, L. C. 1173. Roots tufted, branched at the summit, with scaly sheaths and fibres, throwing out rhizomes or stolons. Stems erect, slender, two-four inches high, with one or two leaves. Radical leaves tufted, incurved, only slightly hairy. Heads about three-flowered, *on longish stalks*, sheathed by membranous fringed, partly scarious and

partly leaf-like bracts; branches deflexed or recurved? Sepals broad-lanceolate, pointed. Fruit roundish-ovate, shorter than the sepals. Rocky alpine heights. Perennial. July. Scotland. On the summits of Cairngorum and Loch-na-gar.

A. 2, C. 3. Lat. 56° — 59° . Alt. 1000—1450 yards. (?) T. 35° — 32° .

ORDER XIV.—**ERIOCAULACEÆ**. THE PIPEWORT FAMILY.

Aquatic and marsh herbaceous plants, with angular stems and slitted sheaths. Flowers unisexual, in heads. Perianth two-six-parted. Stamens four-six. Ovary free, two-three-celled, with solitary pendulous ovules. Fruit capsular, opening. Seeds winged, or with rows of hairs. Embryo on the outside of the farinaceous albumen, remote from the hilum.

This order is distinguished from *Cyperaceæ* by the slit sheaths, and from *Gramineæ* by its angular stem. The only European species is a native of the Hebrides and of the west of Ireland.

Eriocaulon, Linn. Pipewort. Aquatics with the radical leaves in a rosette. (?) Stem-leaves none, or alternate and sheathing. Stems (radical peduncles) solitary. Flowers monœcious, capitate, scaly; barren flowers in the centre; fertile ones in the circumference. Perianth two-six-cleft. Stamens six-three, inserted on the segments of the perianth. Ovary in a four or six-parted perianth. Stigmas almost sessile, two-three-cleft. Fruit capsular, two-three-celled, two-three-valved, bursting at the angles. Seeds solitary, globular.

E. septangulare, With. E. B. 733, L. C. 1149. Roots numerous, white, consisting of jointed fibres. Stems six-eight, rarely seven-ten-angled, height varying with the depth of the water where they grow. Leaves glabrous. Perianth four-cleft. Stamens four. Capsule two-celled. Peaty lakes and pools in Skye and the adjoining islands; also in Cunnemara, Ireland. Perennial. August.

A. 1, C. 1. Lat. 56° — 58° . Alt. 0. T. 47° .

ORDER XV.—**TYPHACEÆ**. THE BULL-RUSH FAMILY.

Herbaceous marsh or aquatic plants, with creeping rhizomes or tufted roots. Stems upright, without knots (nodi), simple or branching. Leaves rigid, ensiform, alternate or radical, often sheathing. Flowers spicate or capitate; the male and female florets in separate groups, male above, female below. Stamens three or six with long filaments. Ovary single, one-celled, with a solitary pendulous ovule. Fruit dry, one-celled, one-seeded, crowned by the persistent style. Seed pendulous, with fleshy albumen. Embryo almost cylindrical in the albumen. Radical directed towards the hilum.

SYNOPSIS OF THE GENERA.

Typha. Flowers in cylindrical spikes. Fruit on long, very slender pedicels, with long hairs (bristles) at the base.

Sparganium. Flowers in globular heads. Fruit sessile, intermixed with scales.

I. Typha. Reed-mace, Cat's-tail. Aquatic, upright plants. Stems cylindrical, not jointed, leafy at the base, with the lower

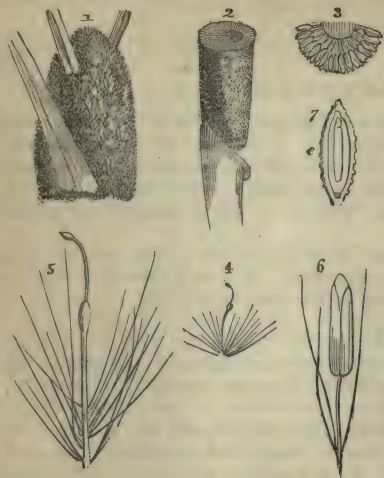


Fig. 116.—1, *Typha latifolia*, part of the barren spike, nat. size; 2, part of fertile spike; 3, segment of barren spike; 4, fruit, nat. size; 5, the same magnified; 6, stamen with seta; 7, section of fruit; e, embryo.

part submersed. Leaves all radical, erect, long, narrow, smooth. Flowers monœcious, in dense, cylindrical, terminal spikes (catkins). Barren flowers on the upper part of the spike, fertile flowers on the lower part, either continuous or interrupted. Stamens three, united below, with drooping, furrowed anthers. Ovary stipitate. Fruit small, ovate, stalked, crowned with the persistent style, and surrounded by bristles (seta) attached to the base of its stalk. (See Fig. 116, 4.) The flat, rigid, linear, basal leaves, and the dense soft cylinders of flowers and fruit are sufficient to distinguish this genus.

1. *T. latifolia*, Linn.

Cat's-tail, or Reed-mace. E. B. 1455, L. C. 1147. Root creeping, with thick, hairy fibres. Stems robust, rigid,

very erect, quite round, nearly two yards high, leafy at the base. Leaves very long, mostly radical, flat, rigid, erect, with long sheaths, quite smooth. Spike terminal, about a foot long, barren and fertile flowers contiguous, or nearly so; the barren portion longest and thickest when in flower; the fertile part begins to swell when the stamens fall off, and finally breaks up into masses of fine fruit (seeds), which are wafted away by means of the downy hairs with which they are surrounded. In ponds, ditches, and slow streams. Perennial. July.

A. 15, C. 60. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

Note.—The roots of this plant have been recommended as esculent.

2. *T. angustifolia*, Linn. Lesser Reed-mace. E. B. 1456, L. C. 1148. Stem similar to that in the preceding species, but less robust. Leaves narrower than in *T. latifolia*, convex on the back and concave in front. Spikes slenderer, barren flowers separate from the fertile ones. Receptacle scaly. In *T. latifolia* the receptacle is hairy. In pools and ditches. Perennial. July.

A. 12, C. 40. Lat. 50° — 56° . Alt. 0—200 yards. T. 51° — 48° .

Note.—This plant was observed by Douglas in the north-west of America.

T. minor was found on Hounslow Heath in the time of Dillenius, but has not been observed since, and so conspicuous a plant could scarcely have been overlooked.

Mr. Watson suggests as a probable explication ("Cybele," vol. iii., p. 36), "that a small form of *T. angustifolia* was gathered and supposed to be *T. minor*." (Compare "Phytologist," vol. iii., pp. 1007-8.)

II. Sparganium, Linn. Bur-Reed. Aquatics. upright or floating. Stem round, solid, leafy. Leaves pliant, flat, or three-angled at the base. Flowers monœcious, in globular alternate heads. Barren flowers in dense round heads. Perianth three-leaved, with three stamens. Fertile flowers in similar heads, only placed below the former. Perianth as in the barren flower. Ovary ovate, with a short style and permanent stigma. Fruit obovate, dry, with a spongy epicarp and woody endocarp, one rarely two-celled by the cohesion of another carpel. Seed solitary, ovate. The round stalks juicy, pliant leaves, and the globular prickly heads of fruit well distinguish this genus.

On the Continent the leaves of these plants are employed by coopers, who place them between the barrel-staves to make their joints tight.

1. **S. ramosum**, Huds. Branched Bur-Reed. E. B. 774, L. C. 1146. Roots tufted. Stems erect, robust, *branching at the summit*. Leaves sword-shaped, radical ones triangular at the base, with flat or slightly concave sides. Floral leaves (bracts) short, clasping. Flowers in alternate, distant, sessile heads, the fertile flowers larger, one-two, the upper and barren smaller and more numerous. Stigma elongated, linear, downy; fruit *triangular*. Ditches. Perennial. July.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

2. **S. simplex**, Huds. Unbranched Bur-Reed. E. B. 745, L. C. 1145. Roots tufted. Stems rather slenderer than in the preceding, quite simple. Leaves triangular at the base, with flat sides. The lowermost head of fertile flowers stalked; the upper fertile and barren flowers in sessile heads. The heads of barren flowers large, numerous. Fruit *oblong, spindle-shaped*. Ditches and muddy places. Perennial. July.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—46°.

3. **S. natans**, Linn. Floating Bur-Reed. E. B. 273, L. C. 1144*. Root fibrous, with runners. Stem flaccid, round, variable in length (depending on the depth of the water where it is found). Leaves floating, narrow, very long, flat above, slightly convex below, with *swollen* sheathing bases. Fertile heads several, one-six, the lowermost on long stalks, the stalks of the upper ones gradually decreasing; barren heads several, one-eight, depending on the luxuriance of the plant. Stigma long. *Fruit with a distinct stalk and pointed beak*. Lakes and still water. Scotland. Perennial. July.

A 18, C. 70. Lat. 50°—60°. Alt. 0—350 yards. T. 51°—43°.

4. **S. minimum**, Bauh., Fries. Least Bur-Reed. L. C. 1144.

Root fibrous. Stems slender, flaccid. Leaves nearly flat, grass-like, narrow, floating, *not enlarged* at their sheathing base. Female heads about two, alternate, the lowermost stalked. The male usually *solitary and terminal*. Fruit *sessile, with a short conical beak*. In ponds and ditches. Perennial. July. St. George's-hill, near Weybridge, and near Barnes, Surrey.

A. 18, C. 70. Lat. 50° — 60° . Alt. 0—350 yards. T. 51° — 43° .

These *two* were till lately described under one name, *S. natans*, hence their distribution is imperfectly known. (Compare "Phytologist," vol. iv., p. 403.)

ORDER XVI.—**ARACEÆ**. THE ARUM FAMILY.

Herbs and shrubs terrestrial or aquatic, containing more or less of an acrid, caustic juice. Roots usually thick, fleshy and farinaceous.



Fig. 117.—*Arum maculatum*. 1, entire plant, with root, leaves, and flower much reduced; 2, receptacle and column (spadix); *a*, ovaries; *b*, stamens; *c*, axis enlarged; 3, section of the seed, showing the embryo in the fleshy endosperm; 4, a longitudinal section, showing the (rarely three-celled) ovary crowned by the stigma; 5, the mature fruit; 6, the cylindrical embryo.

Leaves radical, sheathing, convolute in prefoliation, dilated or linear, with branching or parallel nerves. Flowers spiked (on a spadix) with a spathe, monœcious. Stamens definite or indefinite, very short. Ovary one rarely three-celled, many-seeded. Stigma sessile. Fruit succulent, one-seeded by abortion, or many-seeded. Seeds with a farinaceous albumen.

SYNOPSIS OF THE GENERA.

Arum. Roots fleshy, leaves dilated, fruit pulpy.

Acorus. Roots creeping, leaves linear.

I. *Arum*, Linn. Cuckoo-pint. Root thick, fleshy. Leaves radical, petiolate, hastate or sagittate, entire. Flower-stalk radical, with a leafy, convolute, sheathing spathe. Spike (spadix) naked and succulent, enlarged above. Stamens in whorls about the centre (middle) with filamentary appendages (abortive ovaries?). Ovaries below the stamens, numerous. Fruit succulent, one-celled, one or many-seeded. Seeds roundish, with a thick episperm (testa).

The only British plant of this genus has no stem. Its leaves appear early in spring, near hedges, banks, and sheltered places.

Every part of the plant is excessively acrid, and this quality does not appear to be dissipated neither by maceration nor by boiling.

1. **A. maculatum**, Linn. Common Cuckoo-pint, or Wake-Robin. E. B. 1298, L. C. 1142. Root round, fleshy, with several fibres, very acrid. This quality is not dissipated by many hours' boiling. Leaves large, on long stalks, broadly hastate, shining, often spotted. Spathe light green, purple within, much longer than the spadix. Spike (spadix) erect, the enlarged naked part violet-coloured. Fruit a cluster of beautiful red berries appearing in August. Borders of fields and hedge-banks. Perennial. April, May.

A. 14, C. 60. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—47°.

The mucilaginous fleshy roots, if dried or roasted, might possibly afford some nutritious flour. As above stated, many hours' boiling did not dissipate the acidity, and the root is accordingly deemed a very dangerous article, and, even if rendered eatable, not so palatable and wholesome as a potato.

2. **A. italicum**, Willd. Italian Arum. Curtis. "Bot. Mag." vol. 1., p. 2432. Leaves triangular, hastate at the base, with divaricate lobes and white (yellow) veins. Spadix club-shaped, shorter than with a broad, spreading spathe. Thickets in the Undercliffe, Isle of Wight. Mr. Hambrough Curtis says, "*A. italicum* has often been confounded with *A. maculatum*, yet if any tolerable figure had ever been given, this mistake could hardly have been made. The whole plant is nearly double the size; the leaves are not only larger and veined with white, but the posterior lobes go off at nearly right angles from the foot-stalk, or are hastate, not sagittate. The spathe is very large, of a yellowish green colour, at first erect, afterwards rolled back at the point, &c. A native of Italy, Spain, and the south of France. (Compare "Phytologist," vol. iii., pp. 1009-10.)

II. **Acorus**, Linn. Sweet Flag. Root woody, creeping horizontally. Flower-stalk radical. Leaves sword-shaped, embracing each other (equitant). Flowers sessile on a cylindrical spike. Sepals six, equal, persistent. Stamens six, alternate with, and as long as, the sepals. Ovary free, sessile; stigma sessile. Fruit capsular, membranous, of three cells, not opening. Seeds several, ovate-oblong.

A. calamus, Linn. Common Sweet Flag. E. B. 356, L. C. 1143. Root thick, with long fibres. Stem like the leaves flattened, but rounded and thickened below, and with a prolongation beyond the spike. Leaves quite erect, bright green, two-three feet long, about an inch broad. Spike about three inches long, somewhat lateral, tapering, densely covered with florets. Every part of the plant, when bruised, yields a sweet slightly aromatic smell. In wet places, ponds, ditches, and especially by the sides of rivers, in Norfolk. Barnes Common, Surrey; Hampstead Heath, Middlesex; Woodford, Essex. Perennial. June.

A. 10, C. 30. Lat. 50°—55°. Alt. 0—100 yards. T. 51°—48°.

SUB-DIVISION II. OF MONOCOTYLEDONOUS ORDERS. Aquatics. Seeds without albumen.

The following Orders, viz., *Lemnaceæ*, *Zosteraceæ*, *Potamaceæ*, and *Juncaginaceæ*, have the common character of spadiceous, and generally spathaceous inflorescence. Their obvious distinctive characters are principally their habitat, habit, fructification, and foliage. For example, *Lemnaceæ* have roundish, small, floating fronds, growing on the surface of stagnant water. *Potamaceæ* and *Zosteraceæ* have generally long leafy stalks; the leaves are partly submersed, and partly floating. *Juncaginaceæ* have erect stalks, with narrow leaves, and they grow in wet places.

ORDER XVII.—**LEMNACEÆ**, Duby, Lind. **Pistiaceæ**, Rich. THE DUCK-WEED FAMILY.

Very small floating plants, with simple, cellular, entire or lobed flattened fronds, rooting below. Flowers on the margin, enclosed in a spathe, two male and one female together; the males have one or two stamens each, and the females one ovary. Ovary single, one-celled, with a simple, nearly sessile, stigma, and erect or pendulous ovules. Fruit one-celled, one or more seeded, with a membranous pericarp. Seeds with a coriaceous covering, and no albumen. Easily known by their small flat or gibbous leaves, which are found on all still waters in summer, often forming a thick covering on the surface. In winter they sink to the bottom of the stagnant pools, where they most abound. *Lemna* inhabits the ditches, &c., of the cooler parts of the world, and *Pistia* the tropics.

Note.—The *Pistiaceæ* are plants of the simplest possible structure; of all cotyledonous plants these approach nearest to the acotyledonous orders.

They consist entirely of leafy processes, quite simple, floating and rooting on the water; and produce their flowers and fruit from the margin of the frond.

Lemna, Linn. Duck-weed. The generic characters are the same as those of the Order.

SECT. I.—Frond producing one rootlet, with two lateral fents (clefts). Style elongated, recurved. Fruit one-seeded, not opening.

1. **L trisulca**, Linn. Ivy-leaved Duck-weed. E.B. 926, L. C.



Fig. 118.—1, *Lemna minor*, highly magnified; 2, staminate monandrous flower; 3, a very highly magnified diandrous flower of the same; 4, section of the pistil and contained ovule of the same.

1141. Plant floating during flowering, then submersed. Fronds *thin, pellucid, oblong-lanceolate* or elliptical, tapering at the base, denticulate above, at right angles to each other, united by threes, sometimes in twos, the under sides furnished with simple roots. Ponds, ditches, &c. Annual. April, May.

A. 15, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

2. **L. minor**, Linn. Lesser Duck-weed. E. B. 1095, L. C. 1138. (See our Fig. 118.) Frond (leaf) thick, *but not spongy below*, united by threes or fours, rarely more, *roundish or obovate, not attenuated at the base*, swimming. This plant often covers the entire surface of ponds and ditches. Annual. April—July.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

SECT. II.—Frond with one rootlet, and two lateral fents (slits). Style elongated, recurved. Fruit two-seven-seeded, opening transversely.

3. **L. gibba**, Linn. Turgid Duck-weed. E. B. 1233, L. C. 1139. Fronds green, flat, or slightly convex above, spongy, *inflated*, and *very convex* beneath, roundish or obovate, united in twos and threes, but easily separating, radical, fibrous, long. This species often covers large spaces of stagnant water, but is not so common as *L. minor*. Annual. April—August.

A. 10, C. 40. Lat. 50°—56° (55°). Alt. 0—200 yards. T. 51°—47°.

SECT. III.—Fronds producing tufts of rootlets.

4. **L. polyrhiza**, Linn. Greater Duck-weed. E. B. 2458, L. C. 1140. Fronds *much larger* than in the above species, roundish, obovate or oblong, slightly convex but not spongy below, *reddish brown* above, two-four, connected, roundish, obovate, not tapering, swimming. Ponds and ditches. The flowers of this species have not been seen in England nor in France. The fronds appear soon after mid-summer.

A. 12, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

ORDER XVIII.—ZOSTERACEÆ. THE NAIAD FAMILY.

Submersed marine aquatics. Stems branching. Leaves sessile, with large membranous sheaths, inconspicuous nerves and spinous teeth. Flowers axillary, minute, unisexual on the same or on distinct plants, enclosed in a membranous spathe. Barren flower with one stamen on a very short filament. Fertile flower with a free ovary, consisting of two-three one-celled carpels, and with a solitary ovule in each. Styles two-three. Fruit one-celled, one-seeded, not opening, leathery or woody, enclosed in the persistent, membranous spathe.

Note.—The *Zosteraceæ* (*Naiadaceæ*) and *Potomaceæ* are found mostly in fresh, but a few in brackish water. Stems long, generally much branched. Leaves very cellular, mostly olive or olive-green coloured. Inflorescence spicate or verticillate. Ovaries one or more distinct, with one ovule in each. Fruit, a drupe or nut.

SYNOPSIS OF THE GENERA.

Naias. Male and female flowers on distinct plants (dioecious).

Zostera. Male and female flowers on the same plants.

I. *Naias*, Linn. Barren and fertile flowers on distinct plants (dioecious), almost solitary, in the axils of the leaves. Barren flower in a spathe, with a slit lengthways and terminating in two points. Anther four-angled, abruptly pointed, four-lobed, and opening by four terminal valves. Fertile flower merely an ovary surrounded by a spathe.

***N. flexilis*, Rostk. and Schm.** (*Caulinia intermedia*, Balb. and Nocca.) Flexible *Naias*. Leaves narrow, linear, with minute, pointed denticulations; sheaths ciliate-denticulate. Ponds of salt water. Annual. July—September. Ireland. Only recently added to the British Flora. Will probably be found in England. (See "*Cybele*," vol. iii., p. 26.)

II. *Zostera*, Linn. Grass-wrack. Long, slender, floating aquatics. Stem roundish, branching, leafy. Leaves alternate, long, linear, flat. Inflorescence spathaceous, the base of the leaf forming a spathe and splitting lengthways to let out the fruit. Spike (receptacle spadix) linear, flat, membranous, three-nerved, the middle nerve of the inner side bearing the fruit. Barren flowers merely anthers, which are cylindrical, one-celled, laterally attached to one side of the spike. Ovaries alternate and parallel to the anthers, cylindrical, with two stigmas. Fruit a cylindrical drupe, somewhat juicy, containing one oval striated seed.

1. *Z. marina*, Linn. Common Grass-wrack. E. B. 467, L. C. 1137. Stem filiform, elongate, branched, roundish, jointed, leafy. Leaves very long, flaccid, linear, entire, three-nerved (one-seven-nerved). Spike (spadix) two inches long in a sheath with eight-ten anthers, and as many pistils. In the sea. Perennial. August, September.

A. 17, C. 50. Lat. 50°—61°. Alt. 0. T. 52°—45°.

Var. *β. angustifolia*. Leaves narrower than in the type.

2. *Z. nana*, Roth. Reichenbach, vii., 2. Stems short, filiform, leafy. Leaves linear, narrow, one-nerved. Peduncles filiform, as long as the inflated, oblong-lanceolate spathes. Muddy estuaries, south of England. Perennial. July, August.

A. 2, C. 4. Lat. 50°—56°. Alt. 0. T. 51°—48°.

ORDER XIX.—**POTAMACEÆ**. THE POND-WEED FAMILY.

Aquatics. Leaves all submersed, or the upper ones floating. Stems simple or branching, round or flattened, often rooting. Leaves alternate, rarely opposite, sessile or petiolate, narrow or dilated, with prominent curved or parallel nerves, usually with sheathing stipules, which are connected with each other, and sometimes with the petiole. Flowers axillary, solitary, tufted or spiked, either perfect or unisexual, on the same plant (monococious). Perianth regular, herbaceous, in four divisions, or wanting, and its place supplied by a membranous spathe.

Stamens one-four, at the base of the segments of the perianth. Anthers sessile, or on very short filaments, one-two-lobed, separated by a thick, connective, opening by a longitudinal slit. Ovary free, consisting of four free carpels, each bearing one ovule, and terminated by a style or sessile stigma. Fruit composed of two-three-four, one-seeded, indehiscent carpels, with a thick fleshy or leathery pericarp. Seed in a membranous shell (testa).

SYNOPSIS OF THE GENERA.

Potamogeton. Flowers perfect on a spike; anthers four, nearly sessile.

Zannichellia. Flowers unisexual, axillary. Stamen one. Anther on a long filament.

Ruppia. Flowers perfect. Stamens two, on scale-like filaments. Fruit four long-stalked carpels.

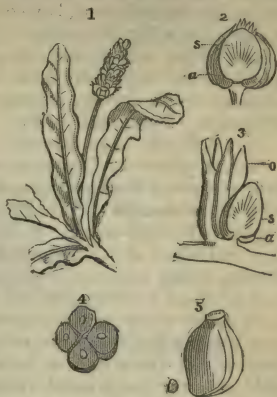


Fig. 119.—1, *Potamogeton crispus*. 2, single flower magnified; s, scale of perianth; a, anther. 3, Flower with three scales removed; s, scale; a, anther; o, ovary. 4, Section of ovary. 5, Fruit magnified.

I. **Potamogeton**,* Linn.

Pond-weed. Stems submersed, simple or branching, round or flattened; their length corresponding to the depth of the water. Leaves membranous-translucent or coriaceous-opaque, submersed or swimming; the floating leaves often larger than the submersed ones. Stipules membranous, united by their internal margins like an axillary spathe; sometimes absent. Flowers on stalked spikes, axillary or terminal, above the water. Perianth in four divisions, which are slightly attenuated at the base, with valvular prefloration. Stamens four, with very short filaments. Ovary sessile, consisting of four free, sessile carpels, each bearing one ovule, with a very short style and peltate oblique stigma. Fruit four, free carpels, or fewer by abortion, with a hard bony endocarp. Seed hooked, embryo folded, radical approaching the hilum.

SECT. I.—*Diversifolia*. Leaves different, upper leathery, floating, ovate (oval), oblong, or lanceolate; often much larger than the submersed leaves. Stipules united and forming an axillary sheath (spathe).

1. **P. natans**, Linn. Broad-leaved Pond-weed. E. B. 1822, L. C. 1132. Root creeping. Stems simple (?), round. Leaves on

* The term *Potamogeton* (ποταμογενῆς) is an adjective of two genders, masculine or feminine; consequently when a masculine substantive is implied it is masculine, when a feminine substantive it is feminine. The word *herba*, or *planta*, is understood here, and therefore it is properly made feminine in Latin. Pliny uses it in this gender, but we cannot quote the place. It has been employed as masculine by Babington, as feminine by Murray ("Northern Flora," 1835), and in the neuter by Cosson and Germain. ("Flor. Par." 1845). In deference to the learned and scientific authors who have employed this term in all its genders, the above-stated reason and authority are here given.

long stalks, often opposite, oval-oblong, obtuse, or slightly pointed, rounded, or cordate at the base, rarely narrowed at both ends; submersed leaves narrower, lanceolate or oblong, *limb rotting or decaying, or destroyed after flowering*. Petioles more or less concave above, Spikes large, cylindrical, on peduncles thick as the stem, not enlarged at the top, with some abortive carpels. Carpels large, *not becoming red in drying*, slightly flattened. In lakes, rivers, ditches, and ponds. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

Var. *β. fluitans*. Leaves all elongated and narrowed at both ends; never plicate at the base; lower leaves persistent.—("Bot. Gaz.")

2. *P. oblonga**, Viv. Fl. It., t. 2. *Polygonifolia*, Pourr. Oblong-leaved Pond-weed. E. B. 2849, L. C. 1133. Root branching long, red when dry. Stems usually short, round. Leaves on long petioles, often opposite contiguous and in a rosette at the summit, most of them floating, and *all smaller than in P. natans*; the *lower leaves do not decay on the flowering of the plant*. Peduncles about the same size as the stem, not enlarged above. Spikes cylindrical, very compact, not above half as large as those of the preceding. Carpels small, slightly compressed, *reddish when dry*. Ditches, small streams, and ponds. Perennial. July.

A. 18, C. 20. Lat. 50°—60°. Alt. 0—500 yards. T. 51°—41°.

3. *P. rufescens*, Schrad. *Fluitans*, Sm. E. B. 1286, L. C. 1136. Reddish Pond-weed. Stems simple or slightly branched at the summit, cylindrical. Lower leaves lanceolate-elongate, submersed, *sessile*, membranous, persistent; the upper leaves floating, *oblong, or oblong-obovate*, gradually attenuated into petioles, obtuse or slightly pointed, opposite, leathery, becoming red in drying. Peduncles about as thick as the stem, *not turgid above*. Spikes oblong, cylindrical. Carpels large, *compressed with acute borders*. Perennial. June—August. Stagnant waters.

A. 17, C. 70. Lat. 50°—59°. Alt. 0—200 yards. T. 51°—46°.

4. *P. lanceolata*, Sm. Lanceolate Pond-weed. E. B. 1985, L. C. 1130. Stem slender, slightly branched, leafy. Leaves nearly all uniform, lanceolate, *tapering at both ends*, "*not apiculate*," two inches long, bluntish, even entire, distinguished by *chain-like reticulations close to the midrib* (Sm.), five-seven-nerved, subcoriaceous, stipulate, floating leaves broader, lanceolate, all submersed. Stipules narrow, acute. Peduncles stout, about as long as the leaves. Spike eight-ten-flowered, dense. Fruit unknown. In streams. Perennial. July. Scotland and Wales.

A. 8, C. 12. Lat. 51°—61°. Alt. 0—100 yards. T. 49°—45°.

P. sparganiifolia, Læst. in Fr. Mant., i. 9. Leaves very long, sessile, much longer than in *P. lanceolata*, and without the chain-like net-work; submersed leaves very narrow, sometimes two feet long. In the river at Ma'am, Galway. Mr. Kirk, Coventry. (See "Phytologist," vol. v., p. 183.)

5. *P. heterophylla*, Schreb. *P. graminea*, Linn. (?) Various-leaved Pond-weed. E. B. 1285, L. C. 1129. Stems nearly filiform,

branching, cylindrical. Upper leaves *floating, ovate, or oblong*, obtuse or pointed, rounded, *on long petioles*, rarely attenuated at the base, leathery, opposite, few, sometimes wanting; lower leaves numerous, submersed, *sessile*, membranous, transparent, oblong-lanceolate or linear-lanceolate, undulate, and persistent. Peduncles *thicker than the stem, enlarging from the base upwards to the summit*. Spikes cylindrical. Carpels slightly compressed, with a slightly prominent, blunt keel. Sandy ponds, turfy marshes, &c. Perennial. June—August.

A. 16, C. 60. Lat. 50°—61°. Alt. 0—200 yards. T. 50°—45°.

SECT. II.—*Conformifolia*. Leaves all submersed, membranous, translucent, the upper rarely above water, all usually of the same shape, oval, oblong or lanceolate, nerves curved, rarely parallel. Stipules as in Sect. I.

§ 1. Leaves all alternate, or some alternate and some opposite.

6. **P. plantaginea**, Ducroz. Plantain-leaved Pond-weed. E. B. 2848, L. C. 1134. Stems creeping below, cylindrical, contracted at the joints. Leaves all submersed or the upper ones only above the water, the upper numerous, and often opposite, all membranous, pellucid, ovate, or oblong-ovate, pointed, *rounded slightly, or cordate at the base*, all stalked, often decaying at the time of flowering. Peduncles *slender*, about as thick as the stem, about twice as long as the spike. Spikes cylindrical, very dense, about an inch long. Carpels *small*, half the size of those of *P. natans*, slightly flattened, with a slightly prominent keel. Colour of the plant lively green, or red. Peaty ponds. Perennial. June.

A. 12, C. 30. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—45°.

7. **P. lucens**, Linn. Shining Pond-weed. E. B. 376, L. C. 1126. Stems branching, cylindrical. Leaves submersed (the upper ones rarely above the water), all uniform, numerous, contiguous, membranous, pellucid, *on very short stalks, elliptical (oblong-lanceolate)*, slightly crisp, usually narrowed at the base, with a very short point, with prominent transverse nerves (veins). Peduncles *thicker than the stem*. Spikes dense, cylindrical. Fruit (carpels) *rather large*, compressed, slightly keeled. (?) Stagnant or running water. Perennial. July.

A. 15, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—46°.

β. *fluitans*, *P. longifolia*, Gay (Sec. 10.) Leaves lanceolate, much elongated and acuminate, sometimes terminating in a spinous point, the prolongation of the median nerve. "Spike with a few distant, whorled flowers."—Babington.

8. **P. perfoliata**, Linn. Perfoliate Pond-weed. E. B. 168, L. C. 1125. Stems more or less branched. Leaves all submersed, uniform, membranous, transparent, *ovate, or ovate-lanceolate*, obtuse, *cordate, and clasping at the base*, slightly wavy at the margin, sessile; stipules none, or decaying when the plant is flowering. Peduncles not turgid at the top. Spikes cylindrical. Carpels compressed, with blunt margins. Rivers and brooks. Perennial. June—August.

A. 17, C. 70. Lat. 50°—60°. Alt. 0—400 yards. T. 52°—43°.

9. **P. crispa**, Linn. Curled-leaved Pond-weed. E. B. 1012,

L. C. 1124. (See our Fig. 119, p. 283.) Stems branched, forked, slightly compressed. Leaves all submersed, *oblong, narrow, strongly undulate (wavy) or crisp*, denticulate, obtuse, or abruptly pointed, sessile. Stipules often decayed before flowering. Peduncles in the forks about as thick as the stem, not enlarged above. Spikes oblong, short, lax. Carpels rather large, ovate-compressed, terminating in a *long, slightly curved, subulate beak*. In running and stagnant water; common. Perennial. June—August.

A. 16, C. 70. Lat. 50° — 58° (60°). Alt. 0—200 yards. T. 51° — 47° .

10. **P. longifolia**, Gay. Long-leaved Pond-weed. E. B. 2847, L. C. 1128. Stems long, with long slender branches. Leaves opposite, *elongate, lanceolate*, entire, all membranous with longitudinal nerves and transverse reticulations. Spikes few-flowered, on *very long peduncles which swell about the centre, and are tapering both ways*. Flowers rather distant, somewhat whorled. Ireland. Mr. John Ball. It is not, however, quite certain that it has been found there. (See "Phytologist," vol. ii., p. 426.)

11. **P. praelonga**, Wulf. Very-long-leaved Pond-weed. E. B. 2858, L. C. 1127. Stems bending in a zigzag way, branching round, striated, *swelling at the knots*. Leaves long, *lanceolate, or oblong-lanceolate, clasping the stem with their base*, margin slightly crisp, or denticulate and hooded at the apex, opposite, pellucid. Peduncles long, rather thicker than the stem, equal. Spike not dense. Fruit *large, greenish-brown*, not smooth, somewhat *crescent-shaped*, ribbed or keeled, with a prominent beak. The specimen above-described is from Nairnshire. In lakes and rivers; not common. Perennial. July.

A. 10, C. 20. Lat. 51° — 58° . Alt. 0—400 yards. T. 49° — 43° .

§ 2. Leaves all opposite.

12. **P. densa**, Linn. Close-leaved Pond-weed. E. B. 397, L. C. 1118. Stems branched, forked, cylindrical. Leaves submersed, membranous, sessile, embracing the stem, ovate, oblong-lanceolate, or lanceolate, often plaited and recurved, all uniform. Stipules very small or wanting. Peduncles *slender, curved* in the forks. Spikes *two-six-flowered, roundish*. Carpels obovate or round, with a short terminal beak, distinctly keeled when dry. Rivulets, ditches, &c. Perennial. June—September.

A. 14, C. 50. Lat. 50° — 56° . Alt. 0—200 yards. T. 51° — 47° .

Var. *a. densa*. Leaves approximate, almost imbricate, ovate, or oblong.

Var. *b. laxifolia*. Leaves distant, oblong-lanceolate, or lanceolate.

SECT. III.—*Graminifolia*. Leaves all submersed, sessile, of the same shape (linear, grass-like), with parallel nerves. Stipules united either by their margins or with the petiole.

§ 1. Stipules united by their margins.

13. **P. Rusilla**, Linn. Small Pond-weed. E. B. 215, L. C. 1120. Stems round, or slightly *compressed*, much branched, very

slender. Leaves *very narrow, linear*, with a short abrupt point, and a distinct middle nerve. Peduncles much longer than the spike. Spike short, interrupted. (?) Carpels small, *with convex sides*, beaked. The plant retains its green colour when dried. Ditches and ponds. Perennial. June—August.

A. 17, C. 70. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

14. **P. acutifolia**, Link. Sharp-leaved Pond-weed. E. B. 2609, L. C. 1122. Stems very much branched, *compressed and winged, flat and leaf-like*. Leaves linear, very narrow, rather abruptly pointed, with three principal nerves, and numerous close intermediate ones, all submersed. Peduncles rather longer than the spike. (?) Bracts ovate elongate, blunt or notched. Spikes oval or cylindrical, about as long as the peduncle. Fruit roundish, keeled, crowned with the oblique, kneed, pointed style. Marsh ditches, Sussex. Perennial. July.

A. 3, C. 6. Lat. 50°—53°. Alt. 0—50 yards. T. 51°—49°.

15. **P. zosteræfolia**, Schum. *P. cuspidatum*, Sm. Zostera-leaved Pond-weed. E. B. 2685, L. C. 1123. Stem compressed. Leaves *with three principal ribs*, broader than the leaves in *P. compressa*, and tapering at each end, *with an abrupt terminal point*, hence Smith's name, *cuspidatum*, from *cuspis*, a point. Spikes *cylindrical, dense, on long peduncles*. (A foot long?) Fruit (carpels) obovate, keeled, terminated by the persistent style. In rivers and lakes. Perennial. June.

A. 6, C. 12. Lat. 51°—57°. Alt. 0—100 yards. T. 49°—47°.

16. **P. graminea**, Linn. (?) *P. obtusifolius*, Koch. Grass-leaved Pond-weed. E. B. 2253, L. C. 1121. Stem slightly compressed, with rounded edges, branched and leafy. Leaves *broadly linear, blunt, three-nerved*, with obscure connecting veins. Peduncles very short, about as thick as the stem. Spikes *ovate, dense, continuous*, about as long as the peduncle. Fruit obovate, keeled, crowned with a short point. Ditches. Perennial. July—September.

A. 13, C. 40. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

17. **P. compressa**, Linn. Flat-stalked Pond-weed. E. B. 418, L. C. 1120 b. Stems *slightly compressed*, slender-branched, leafy. Leaves *linear, five-nerved, sharply and shortly pointed*. Peduncles slightly enlarged above, longer than the spike. Spike short, lax. Fruit obovate, keeled, with a very short point, in shape like the fruit of *P. graminea*. Ditches. Perennial. June—August.

A. 13, C. 25. Lat. 50°—60°. Alt. 0—200 yards. T. 51°—46°.

P. pusilla, Linn., is a smaller plant, with longer peduncles and denser spike than those of *P. compressa*.

18. **P. flabellata**, Bab. *P. zosteracea*, Bab., not Fries. L. C. 1119. Grasswrack-like Pond-weed. Stem slender, round, somewhat flattened on one side. Leaves three-nerved, *linear, pointed*, concave on one side and convex on the other, with herbaceous striated sheaths, which are crowned with a scarious appendage. Carpels roundish-obovate, rounded on the back, with a prominent keel. Perennial. July. In the Serpentine, Hyde Park, London. Dr. J. A. Power.

19. **P. filiformis**, Nolte. Hair-leaved Pond-weed. L. C. 1119*.

Stem * * * ? Leaves *linear setaceous*, with transverse nerves. Peduncles very long, bearing very distant whorls. Carpels *obovate, rounded on the back, neither keeled nor ridged*. Scotland; rare. Perennial. June, July.

A. 17, C. 70. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

20. **P. trichoides**, Cham. Hair-like-leaved Pond-weed. Rehb. Fl. Germ., vii., 21, 22. L. C. 1120*. Stem round, branched, leafy. Leaves *almost setaceous*, but tapering and finely-pointed, with one nerve, without stipules. Peduncles moderately long, scarcely enlarged above. Spikes short, slender, lax. Fruit semicircular, *with a tooth on the inner edge near the base*. Crowned with a bluntish point. Bixley, near Norwich. Perennial. July, August.

§ 2. Stipules united with the petiolar part of the leaf, sheathing the stem.

21. **P. pectinata**, Linn. Fennel-leaved Pond-weed. E. B. 323, L. C. 1119*. Stems branching, almost filiform, cylindrical. Leaves *linear, very narrow*, flat or channelled, with transverse, *distinct nerves extending from the midrib to the margin*, petiolate, *with a long sheath*. Peduncles slender (about as thick as the stem), often very long. Flowers whorled, in pairs, distant, forming an interrupted spike. Carpels large, often solitary by abortion, hemispherical, slightly compressed, with a prominent beak. Perennial. July—September. Rivers, ponds, &c.

A. 17, C. 70. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

Var. β . *setacea*. Leaves linear, setaceous.

II. **Zannichellia**, Linn. Horned Pond-weed. Slender, branched, submersed aquatics. Leaves linear. Flowers perfect or monœcious, axillary. Male flower one naked stamen, with an erect anther, which is two-four-celled, with a thick connective. Female flower beside the male one in a tumid, campanulate perianth, containing four-five, rarely two or six ovaries, each with a short, erect style, and dilated entire or toothed stigma. Fruit four one-seeded, stalked, free carpels. Seed with a very thin membranous skin (episperm).

Z. palustris, Linn. Horned Pond-weed. E. B. 1844, L. C. 1136. Stems filiform, branching. Leaves linear or capillary, pointed. Flowers axillary. Carpels linear-oblong, turgid, on a short pedicel, and with a long, compressed, subulate beak, which has a tubercled and sometimes spinous back. Ponds; not uncommon. Annual? July?

A. 18, C. 70. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

Var. α . *major*. Carpels sessile, or almost sessile.

Var. β . *pedicellata*. Carpels on longer or shorter pedicels.

III. **Ruppia**, Linn. Tassel Pond-weed. Aquatics with slender, round, branching, leafy stems, and with alternate narrow leaves. Flowers in two-flowered spikes, perfect in a spathe formed of the sheathing base of the leaf, consisting of four naked sessile anthers, and four, sometimes five, ovaries, with sessile stigmas. Fruit con-

sisting of four ovate, one-seeded carpels, each elevated on a stalk four times its own length. *Seed* one, tipped with a short lateral terminal beak. The naked, sessile anthers and ovaries, which are stipitate in fruit, and the much shorter flowering spike, are almost the only characters that distinguish this genus from *Potamogeton*.

1. **R. maritima**, Linn. * Tassel Pond-weed. Reichenbach, vii., 26. Stems slender, round, long, filiform, branched, leafy, submersed. Leaves linear, setaceous, with an *inflated sheath at the base* (part of the leaf) often spirally twisted. Peduncles elongated. Spikes two-flowered. Fruit ovate, *obliquely erect*, with a *long straight beak*. In salt marshes. Perennial. July, August. *A. L. C.*

2. **R. rostellata**, Koch. E. B. 136 (?) Stems as in the foregoing. Leaves filiform, linear, sheathing at the base, *closely embracing the stem at the base, not lax nor convolute*, as in *R. maritima*. Anther cells round. Fruit with a long *oblique* beak. With the preceding species. Perennial. July, August.

ORDER XX.—JUNCAGINACEÆ, Rich. THE ARROW-GRASS FAMILY.

Herbaceous bog or marsh plants. Stems simple, erect. Leaves linear or somewhat cylindrical, radical, or alternate, sheathing at the base; sheath cleft, with an entire ligule. Flowers in a cluster, or terminal spike (see Fig. 120), perfect. Perianth in six divisions. Sepals free, or nearly so, in two rows; the inner row with a higher position. Stamens six; anthers extrorse. Ovary free, with three-six carpels, distinct or united by their inner angles; axis prolonged. Ovules one-two in each, inserted at the inner angle of the carpel. Stigmas sessile, as many as the carpels. Fruit dry, with three-six one-two-seeded carpels opening by the internal angle. Seeds ascending or erect.

SYNOPSIS OF THE GENERA.

Scheuchzeria. Perianth deeply six-parted. Ovary with two ovules in each carpel.

Triglochin. Perianth of six sepals. Ovary with one ovule in each carpel.

I. **Scheuchzeria**, Linn. This plant has no English name. Root fibrous. Stem rooting at the base, leafy. Leaves with long slit sheaths. Flowers in terminal clusters with leafy bracts. Peri-



Fig. 120.—1, *Triglochin palustre*, nat. size. 2, Flower, magnified, showing the position of the sepals. 3, Fruit, nat. size. 4, Pistil, magnified. 5, Outer leaflet of perianth with stamen; *s*, a single leaflet; *st*, stamen with anther, both magnified. 6, Section of capsule, showing the seed.

anth six-parted, persistent; the three inner segments narrower than the three outer ones. Anthers adnate, with short filaments. Ovaries three-four, one-celled, with two ovules in each. Stigma sessile, papillose. Fruit leathery, of several one-celled, two-seeded carpels. Seeds attached to the base, erect, with a thick episperm, and thin internal membrane.

S. palustris, Linn. Marsh Scheuchzeria. E. B. 1801, L. C. 1117. Stems decumbent at the base and leafy, a span high, round and smooth. Leaves few, erect, distant, roundish, blunt, spongy within. Bracts, one under each flower, leaf-like, longer than the flowers. Flowers greenish, about five in a terminal cluster with elliptical sepals. Fruit large, tumid, wrinkled. Wet mossy bogs; very rare. Yorkshire, Salop, ~~Perthshire~~. Perennial. June.

A. 5, C. 6. Lat. 52°—57°. Alt. 0—200 yards. T. 49°—48°.

II. Triglochin, Linn. Arrow-Grass. Perennial marsh plants, with upright stems and numerous, radical, linear, or roundish (cylindrical) leaves. Flowers in a spiked cluster. Perianth of six roundish, concave, deciduous leaves (sepals), three outer and three inner (see Fig. 120). Anthers almost sessile, opposite to the sepals, large, roundish, two-lobed. Stigmas bearded. Fruit three-six carpels, each one-seeded, with pointed valves, opening at the base. Seeds long, triangular (see Fig. 120). The straight stems, radical leaves, long spike of flowers, and the angular capsular fruit, opening at the base, together with the long triangular seed, will be sufficient for the identification of this genus.

1. **T. palustre**, Linn. Marsh Arrow-Grass. E. B. 366, L. C. 1116. Root consisting of many tufted fibres. Stems slender, solitary, leafy only at the base. Leaves in tufts, narrow, roundish, more than half as long as the stem. Flowers numerous, alternate, on short stalks in a long, narrow, erect cluster. Fruit linear, oblong, smaller at the base, with three linear, blunt, spreading carpels. The valves of the capsule, when separate, have the appearance of a three-barbed, arrow-head; hence the name *Triglochin* (three-pointed). In boggy meadows. Perennial. July.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—950 yards. T. 52°—37°.

2. **T. maritimum**, Linn. Sea Arrow-Grass. E. B. 255, L. C. 1115. Root woody. Leaves rather fleshy. Fruit ovate, tumid, with six carpels and six valves, not separating so widely as in *T. palustre*. Salt marshes. Perennial. June.

A. 18, C. 50. Lat. 50°—61°. Alt. 0. T. 52°—45°.

DIVISION II.—(See p. 135.) Perianth either all coloured or partly herbaceous; aquatics.

† Ovary free.

SUB-DIVISION I.—Outer portions of the perianth (outer sepals) herbaceous, or only slightly coloured; inner pieces of the perianth coloured. (See p. 135.)

Orders XXI. and XXII.—These two orders, *Alismaceæ* and *Bu-*

tomaceæ, are known from each other by their leaves. In Order XXI. those organs are dilated and flat; in Order XXII. they are linear and triquetrous (three-sided).

ORDER XXI.—**ALISMACEÆ**, Juss. THE WATER-PLANTAIN FAMILY.

Herbaceous, aquatic, or marsh plants. Stems rarely leafy. Leaves in radical tufts or in a rosette, with dilated sheathing petioles; limb entire, with curved converging nerves. Flowers stalked in terminal whorls or panicles. Perianth in six divisions, the three outer herbaceous, the three inner coloured, imbricated in prefloration, usually very fugacious. Stamens six-twelve or indefinite. Ovary free, with numerous or definite carpels; ovule one, rarely two. Style short, persistent, continuous with the ventral suture. Fruit dry, many carpels, or rarely six-twelve, one-seeded, rarely two-seeded, indehiscent, or opening by the ventral suture. Seed with a membranous testa. Embryo cylindrical; radicle contiguous to the hilum.

SYNOPSIS OF THE GENERA.

Alisma. Flowers perfect. Stamens definite. Carpels numerous, free, in a roundish head.

Actinocarpus. Flowers perfect. Stamens definite. Carpels six-eight, united by their ventral suture, radiating.

Sagittaria. Flowers unisexual. Stamens indefinite. Leaves arrow-shaped.

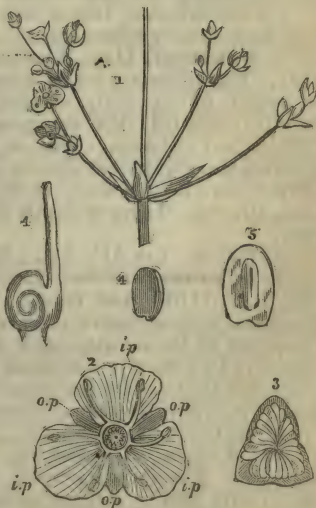


Fig. 121.—1, Umbel of *Alisma plantago*, reduced. 2, Flower magnified; *ip*, inner perianth; *op*, outer perianth. 3, Fruit. 4, Single carpel with the style, magnified; 4', ditto, without the style magnified. 5, Section of a carpel showing the embryo.

I. **Alisma**, Linn. Water-Plantain. Aquatic perennials, with simple, entire leaves. Flowers in whorls, umbellate or paniced, on long peduncles. Stamens six, opposite to the inner divisions of the perianth, with roundish anthers. Ovaries numerous, clustered, with simple, oblique styles and obtuse stigmas. *Fruit* compressed, rounded externally, indehiscent, one- rarely two-seeded. The ovate or lanceolate ribbed, plantain-like leaves, the umbellate or paniced flowers, the three exterior green sepals, the three interior coloured ones, and the aggregate carpels are sufficient to distinguish this genus.

1. **A. plantago**, Linn. Greater Water-Plantain. E. B. 837,

L. C. 1109. Root fibrous. Stem erect. Leaves radical, tufted, or in a rosette, ovate, oblong or lanceolate, five-seven-nerved, narrowed, or slightly cordate at the base. Flowers paniced, in successive series of whorled branches, slightly pink or white, not large. Carpels laterally compressed, rounded at the summit, disposed either in a single row or in a depressed somewhat triangular head. Pools, ditches, rivers. Perennial. June.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

a. the form described above.

β. angustifolium. Leaves lanceolate, narrow, attenuated at the base.

γ. graminifolium. Leaves linear by the abortion of the limb, often very long, usually submersed.

2. **A. natans**, Linn. Floating Water-Plantain. E. B. 775, L. C. 1111. Root fibrous. Stems submersed, floating or rooting, variable in length, filiform, leafy. Radical and lower leaves narrow, often greatly elongated; the upper ones three-nerved, usually on long petioles, and swimming, oval or oblong rounded at the two ends. Flowers large, white, one-five, on long stalks at the joints of the stem. Carpels six-fifteen, oblong, or slightly compressed, with an abrupt beak, striated. Lakes of North Wales and Cumberland. Perennial. July.

A. 4, C. 8. Lat. 51°—55°. Alt. 0—200 yards. T. 49°—47°.

3. **A. ranunculoides**, Linn. Lesser Water-Plantain. E. B. 326, L. C. 1110. Root fibrous. Stems erect, rarely spreading or prostrate, without leaves. Leaves radical, in a tuft, three-nerved, lanceolate or linear, attenuated at both ends. Flower large, pale rose, on a long stalk in a terminal umbel, or in two whorls. Carpels numerous, oblong, with five prominent angles, with a beak, in a round head. In wet turfy places. Perennial. June.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

Var. *β. repens*. *A. repens*, Sm. Stems prostrate, creeping. Leaves lanceolate. Carpels compressed. The author, quoted above, says, "I concur with both my obliging correspondents in thinking the *A. repens* no more than a variety," &c.

II. **Actinocarpus**, Br. Star-Fruit. Habitat, stem, and leaves the same as *Alisma*. Perianth and stamens ditto. Ovaries six-eight, radiating. Fruit capsular (follicular), six one- or two-seeded carpels, spreading star-like, keeled, compressed, sometimes dehiscent.

Note.—The six-rayed fruit is almost the only distinctive character of this genus.

A. Damasonium, R. Br. Star-headed Water-Plantain. E. B. 1615, L. C. 1112. Root many long fibres. Stems solitary or more or less numerous, spreading or ascending, rarely erect. Leaves radical, three-nerved, cordate or truncate at the base. Flowers small, white or rosy, on stout stalks, in a terminal umbel or in two or more whorls. Carpels lanceolate, with sharp points, compressed. Pools; on a gravelly soil. Perennial. June.

A. 4, C. 10. Lat. 50°—53°. Alt. 0—100 yards. T. 51°—49°.

III. Sagittaria, Linn. Arrow-head. Aquatics, emerging above the water. *Leaves* stalked, entire, arrow-shaped or elliptical on long stalks. Flowers whorled on tall common stalks. *Perianth* in three uncoloured and three coloured divisions. Male flowers with as many as twenty stamens (indefinite). Anthers cordate, vertical. Female flowers fewer than the male ditto, situated below them. Ovaries numerous on a globose receptacle, with very short styles and permanent stigmas. *Carpels* of the fruit dilated and compressed. This handsome genus of aquatics is readily determined by the sagittate, radical leaves, also by the large, white, handsome flowers, and by the globular carpel-bearing head.

S. sagittifolia, Linn. Common Arrow-head. E. B. 84, L. C. 1113. Root fibrous, bearing rhizomes, with a fleshy bulb at their summit. Stem erect or ascending, leafless. Leaves radical on long petioles, long and sharply lobed at the base (sagittate). Flowers large, rosy-white at the base, in an interrupted, erect cluster; the upper flowers male, the lower female, on shorter stalks than the males. Fruit (carpels) in round heads, compressed, pointed with the style. Ditches in meadows. Perennial. July.

A. 13, C. 40. Lat. 50°—56°. Alt. 0—100 yards. T. 51°—47°.

ORDER XXII.—**BUTOMACEÆ**, Rich. THE FLOWERING-RUSH FAMILY.

Herbaceous plants growing in water. Stems erect, leafless. Leaves narrow, dilated at the base, channelled. Flowers perfect, pedicelled, in a terminal umbel, subtended by three membranous bracts. *Perianth* in six divisions, the three outer pieces slightly coloured, the three inner, larger and coloured, deciduous, imbricated in prefloration. Stamens nine. Ovary free, consisting of six carpels, more or less united by the ventral suture, with many ovules. Style short, terminating in a lateral stigma. Fruit composed of six carpels, either free or more or less connected by the ventral suture, many-seeded, opening by the internal angle. Seeds very small, with a membranous shell (testa). Embryo cylindrical, straight; radicle towards the hilum.

Butomus, Linn. Characters of the genus (the only one) the same as those of the order.

B. umbellatus, Linn. Common Flowering-Rush. E. B. 651, L. C. 1114. Root bearing horizontal, fleshy rhizomes, with leaves above, and radical fibres below. Leaves very long, linear, tapering, pointed, triangular above. Stems tall, round. Flowers large; red, handsome, in a terminal umbel. Rivers; lakes. Perennial. June, July.

A. 11, C. 40. Lat. 50°—55°. Alt. 0—100 yards. T. 51°—47°.

SUB-DIVISION II.—*Perianth* coloured, rarely herbaceous. Terrestrial plants. (See p. 135.)

The *Melanthaceæ* have tricarpeous fruit united only at the base by the inner suture. *Liliaceæ* have capsular three-celled fruit. *Aspa-*

ragaceæ, fleshy (baccate) fruit. *Trilliaceæ* are distinguished by their erect stems, whorled leaves, and fleshy fruit.

ORDER XXIII.—**MELANTHACEÆ**, Batsch. **Colchicaceæ**, D. C.

Herbaceous plants, usually with poisonous juice. Roots bulbous or fibrous. Stems simple or branching, leafy or naked, sometimes only a radical peduncle. Flowers perfect, rarely unisexual by abortion. Perianth coloured in six nearly equal divisions; in two rows, free or united. Stamens six, inserted in the tube formed by the united bases of the divisions of the perianth, or at the base of the divisions. Anthers extrorse. Ovary free, consisting of three carpels, more or less united by the ventral suture. Ovules numerous, inserted on the inner angle of the carpels, usually horizontal or slightly reflected. Styles three, rarely united below. Fruit a capsule composed of three carpels, more or less united by the ventral suture, and opening by the same. Seeds numerous, with a membranous testa. Albumen thick, fleshy, or cartilaginous. Embryo cylindrical. Radicle directed towards the hilum.

Note.—The *Melanthaceæ* are distinguished from the next order by their trifold style and entire stigmas.

SYNOPSIS OF THE GENERA.

Colchicum. Root bulbous. Perianth with a long slender tube, and a six-parted limb.

Tofieldia. Root fibrous. Perianth of six pieces.

I. *Colchicum*, Linn. Meadow Saffron. Bulb solid, with a membranous coat, producing flowers in autumn, and fruit and leaves in spring. Leaves sessile, flat, lanceolate. Flowers large, one-two-five, surrounded by membranous sheaths. Perianth funnel-shaped, with a very long, slender, angular tube. Stamens six, inserted in the throat of the perianth. Ovules in two rows, or irregularly arranged. Carpels entirely united in their lower part, united only



Fig. 122.—*Colchicum autumnale*. 1, the plant in flower before the expansion of the leaves; 2, section of calyx, showing the stamens and three stigmas; 3, the three carpels in the calyx tube; 4, mature fruit; 5, section of seed showing the position of the embryo; 6, embryo detached.

by their ventral suture in the middle, and free and opening at the summit by the ventral suture. Seed nearly globular, with a wrinkled testa.

C. autumnale, Linn. Common Meadow Saffron. E. B. 133, L. C. 1105. Bulb invested with a black membranous tunic. Leaves large, narrowing at the summit, erect, surrounding the fruit. Tube of the perianth five-six times as long as the limb, with oblong-lanceolate divisions, the inner three shorter than three outer. Fruit large capsular. Seeds in four irregular rows in each carpel. Meadows. Perennial. Flowers September, and is in fruit in May and June. West of England, in meadows; often too common.

A. 11, C. 25. Lat. 50°—55°. Alt. 0.—200 yards. T. 50°—47°.

II. Tofieldia, Huds. Scottish Asphodel. Roots creeping. Stems nearly leafless. Leaves ensiform. Flowers in spikes, heads or clusters, with a common three-cleft involucre. Perianth consisting of six oblong, spreading sepals. Stamens six, as long as the sepals, and opposite to them. Carpels three, connected at the base, and separate at the apex, opening by the inner (ventral) suture, two-valved, many-seeded. Seeds elliptical-oblong, attached to the partitions (inner margins of the valves).

T. palustris, Huds. Marsh Scottish Asphodel. E. B. 536, L. C. 1106. Root somewhat woody, with long fibres. Stems quite simple, four-six inches, ascending, round, wiry, leafless, except near the base. Leaves sword-shaped, equitant, flat, about an inch long, mostly radical, sheathing. Flowers whitish in spikes, more or less distant, on very short pedicels, with minute, partly scarious-toothed bracts. Wet mountain-pastures in the north of England, Scotland, and Ireland. Near Killin, Breadalbane. Perennial. July.

A. 5, C. 12. Lat. 54°—59°. Alt. 350—850 yards. T. 43°—38°.

ORDER XXIV.—**LILIACEÆ**, D. C. THE LILY FAMILY.

Perennial herbaceous plants, with bulbous or fleshy roots. Stem simple, rarely branching, leafy or leafless. Leaves scattered or almost whorled, sometimes in radical tufts, lanceolate or linear, flat, or sometimes fistular (hollow), round or nearly round.* Flowers perfect, conspicuous, in spikes, heads, clusters, umbels or panicles, rarely solitary, usually furnished with bracts. Perianth caducous, withering or persistent, in six, usually equal divisions, in two rows, free, or more or less united. Stamens six, inserted on the perianth. Anthers two-lobed, with a basal or dorsal attachment. Ovary free, three-celled, with many or few ovules. Ovules inserted on the internal angle of the cells, horizontal or diverging more or less from the horizontal position. Style simple, sometimes absent. Stigmas three, more or less coherent. Fruit capsular, three-celled, many- or few-seeded, with valvular dehiscence (opening by valves). Seed with a black, brittle shell, or a brownish, membranous, or spongy tunic. Al-

* Round, in this and similar examples, means cylindrical, not orbicular.

bumen fleshy or cartilaginous. Embryo straight or curved. Radicle towards the hilum, or more or less distant from the hilum.

Note.—The *Liliaceæ* are distinguished from the *Melanthaceæ* by the simple style, and the disposition of the seeds, which are closely packed on each other in one or more rows.



Fig. 123.—*Lilium candidum*. *a*, perianth; *b*, stamens and style with stigma; *c*, ovary; *d*, section of style; *e*, stigma; *f*, mature ovary; *g*, seed; *h*, section of seed, showing the embryo.

TRIBE I.—**Tulipeæ**. Roots bulbous. Divisions of the perianth free or cohering only at the base. Stamens under the ovary (hypogynous) or inserted at the base of the divisions. Seeds flattened. Testa of the seed membranous or spongy, brown, reddish, or yellow.

Genera.—*Tulipa*, *Fritillaria*, *Lilium*, *Lloydia* (*Anthericum*).

SYNOPSIS OF THE GENERA.

Tulipa. Stem one-flowered. Stigma sessile.

Fritillaria. Sepals with a depression (pit) at the base. Style three-cleft.

Lilium. Sepals with a furrow at the base of each. Style simple. Stigma caitate.

Lloydia. Sepals spreading, with a transverse fold at the base. Style filiform. Stigma triangular.

Simethis. Fruit capsular, globose.

I. *Tulipa*, Linn. Tulip. Bulb coated. Stem leafy at the base only. Leaves oval, tapering at each end. Perianth campanulate in six divisions, caducous. Stamens six, compressed, tapering, with quadrangular versatile anthers. Ovary large, oblong, triangular, with a triangular or three-lobed, sessile, permanent stigma. Capsule three-celled, three-valved, with central partitions and numerous flat seeds, crowded on each other, in two rows. Tulips are distinguished by the large three-cornered capsule, containing flat, obovate seeds arranged in two rows. The precious Tulip of florists and the early flowering *Van Thol* are species of this genus.

***T. sylvestris*, Linn.** Wild Tulip. E. B. 63, L. C. 1077. Bulb ovate, outer coat thin, brownish. Stem cylindrical, erect, or slightly bent, naked at the summit, about a foot high. Leaves two-three, lanceolate, elongate, glaucous, six-twelve inches long. Outer divisions of the perianth green at the base; all the divisions acuminate, narrowed at the base, and the inner more or less, pubescent-ciliated,

at the base and summit. Stamens hairy at the base. Chalk pits; very rare. Perennial. May. *A. C. Lat. New*

Note.—This plant rarely flowers in a wild state. In cultivation there are sometimes two flowers on one stalk. It is still abundant in the station at Muswell Hill, Middlesex (see "Phytologist," N. S., vol. i., index); also in Wimbledon Park, Surrey.

Sub-var. *pluriflora*. Stem divided into two-three, one-flowered, peduncles. This variety is rare in the wild state of the British Tulip. In its natural habitat it rarely flowers at all. Alien? It is, however, apparently wild in several counties between Surrey and Forfar.

II. *Fritillaria*, Linn. Fritillary. Bulb lobed or scaly. Stem leafy. Leaves linear-oblong. Perianth campanulate, spreading at the base, of six pieces, with a nectariferous cavity at the base of each. Stamens six, attached to the base of each sepal. Anthers oblong with dorsal attachment. Ovary oblong, triangular. Style simple, with three spreading stigmas, which are downy on the upper side. Capsule three-lobed, three-celled, three-valved, with central partitions. Seeds very numerous, flat, crowded on each other, in two rows. The leafy stem, the pore at the base of each piece of the perianth, and the dorsal attachment of the anthers will serve to distinguish this genus from *Tulipa*, which it closely approaches both in habit and structure.

F. *Meleagris*, Linn. Common Fritillary, Snake's Head. E. B. 622, L. C. 1078. Bulbs aggregate, small, lobed. Stem round, flexuous, leafy, usually one-flowered; but sometimes in cultivated plants there are two-three flowers. Leaves linear-lanceolate, channelled, acuminate, rather glaucous, alternate. Flowers pendulous, with regularly chequered, ovate-lanceolate divisions, with their apices cucullate (slightly turned in). Ovary obovate, abrupt, furrowed. Meadows at Totteridge, Herts; plentiful. Perennial. April.

A. 6, C. 15. Lat. 50°—53°. Alt. 0—100 yards. T. 50°—49°.

Note.—This rare plant has of late years disappeared at Mortlake.

III. *Lilium*, Linn. Lily. Roots an aggregation of scaly bulbs. Stems leafy. Leaves scattered or almost whorled. Flowers large, very handsome, terminal and lateral. Perianth bell-funnel-shaped, divisions only slightly cohering at the base, spreading or reflexed or coiled at the margin, with a nectariferous furrow lengthways. Style erect or slightly curved.

L. *Martagon*, Linn. Turk's Cap. E. B. 2799. L. C., p. 15 or 16. Stems erect, about two feet high, rough. Leaves elliptical-lanceolate, whorled. Flowers pendulous, carnation-violet, segments of perianth reflexed. Copse between Mickleham and Headley, Surrey. Also in a wood near Totteridge, Herts (see "Phytologist," as above). Alien. (See "Cybele," vol. ii., p. 449.)

L. *pyrenaicum*, Gouan. Stems stout, tapering, erect, very leafy. Leaves scattered, linear. Flowers on long stout peduncles, reflexed. Segments of the perianth revolute, warty, or glandular within.

Between S. Molton and Mollond, North Devon. Mr. G. Maw. Alién.

L. candidum, Linn. White Lily. Stems robust, tapering, round, smooth, shining. Leaves lanceolate, scattered. Flowers large, white on nearly erect pedicels, clustered, horizontal. Petals obovate, tapering below, furrowed, reflexed. This noble plant, cultivated in almost every garden, and universally known, is a native of the Levant. Perennial. July.

IV. **Lloydia**, Salisb. Spiderwort. Stem variable, either simple or branched. Leaves often radical, narrow. Sepals spreading, elliptical-oblong. Stamens six, attached to the sepals. Anthers roundish, with basal attachment. Ovary roundish, three-celled, three-valved, three-angled, with central partitions. Style filiform, with a triangular stigma. Seeds few, angular, and flat.

L. serotina, R. Welsh Spiderwort. E. B. 793. *Anthericum ser.*, L. C. 1095. Root fibrous, tufted. Stems slender, erect, leafy, five-six inches high; stem-leaves flat, sheathing; root-leaves cylindrical, filiform. Flowers solitary, white, with reddish lines. Welsh mountains (Cærnarvonshire). On Twl Du, a fearful chasm near Llanberis, North Wales. Not hitherto found in any other part of the British Isles. Perennial. June.

A. 1, C. 1. Lat. 53°—54°. Alt. 700—800 yards. T. 41°—40°.

V. **Simethis**, Kunth. Stem erect, branching. Root-leaves linear; stem-leaves rudimentary. Flowers solitary, on long pedicels. Sepals coloured, equal, spreading. Ovary sessile. Ovules two. Fruit capsular, globose. A native of the Pyrenees, Sardinia, Barbary.

S. bicolor, Kunth. *S. planifolia*. E. B. 2952, L. C. 1095*. Stem erect, tall, furrowed, smooth, branching at the top. Leaves radical, grass-like, about as long as the stem. Flowers in panicles, cymes, on spreading, bracteate pedicels. Perianth with striated or ribbed, cleft, segments. "Grows in small quantity about two miles distant from Bourne, Dorset, on what was once part of Poole Heath, but is now a plantation of firs." ("Cybele Brit.," vol. ii., p. 462; "Phytologist," vol. iii., p. 260.) A recent and interesting addition to the "British Flora."

A. 1, C. 1. Lat. 50°—51°. Alt. ? T. 51°.

TRIBE II.—**Scilleæ**. SQUILL TRIBE. Roots bulbous, or composed of thick fleshy fibres. Divisions of the perianth with depressions (pits) furrows or folds at their base. Stamens hypogynous or inserted in the tube. Seed round or angular, usually with a black brittle testa.

SUB-TRIBE I.—**Hyacinthææ**. Roots bulbous, rarely with rhizomes, bearing several bulbs.

Genera.—*Ornithogalum*, *Gagea*, *Scilla*, *Agaphis*, *Allium*, *Muscari*.

SYNOPSIS OF THE GENERA.

Ornithogalum. Flowers white; filaments flat; anthers dorsally attached.

Gagea. Flowers yellow. Anthers attached by their base.

Scilla. Divisions of the perianth spreading. Stamens inserted on the base of the divisions.

Agaphis. Divisions of the perianth conniving, campanulate. Stamens inserted about the middle of the divisions, and attached by two-thirds of their length.

Allium. Flowers in a terminal umbel, enclosed by a spathe (bract) before flowering.

Muscari. Perianth tubular, urceolate, with six short teeth.

SUB-TRIBE II.—**Anthericeæ**. Roots not bulbous, either fascicled or fibrous. Stems, if present, erect.

Genera.—*Narthecium*, *Simethis*. (See Tribe I., *Tulipeæ*.)

VI. **Ornithogalum**, Linn. Star of Bethlehem. Bulb coated, roundish. Stem without leaves, simple, or branching at the summit. Leaves linear, mostly radical. Flowers white, or whitish yellow, pedicelled, in spike-like clusters or terminal corymbs in the axils of membranous bracts. Perianth spreading in six divisions, withering. Stamens hypogynous, or inserted at the base of the divisions of the perianth; filaments dilated. Style filiform, simple, stigma three-angular. Capsule ovate, three- or six-angled, three-celled, few-seeded. Seeds ovate, roundish or angular, with a rough black testa. The stems of these handsome plants are usually round, tapering, and leafless, bearing an umbel or panicle of white or yellow flowers. The leaves are linear and mostly radical.

1. **O. umbellatum**, Linn. Common Star of Bethlehem. E. B. 130, L. C. 1090. Bulbs ovate. Leaves all radical, linear and channelled, *about as long as the stem*, partly withered when the plant is in flower. Stem six-ten inches, branching at the very summit. Bracts membranous, lanceolate-acuminate. Flowers in a *terminal lax corymb*; pedicels longer than the bracts, erect or ascending when in flower, spreading when in fruit. Divisions of the perianth oblong, obtuse, white, with a green strip on the back, connivent before the rising of the sun and in humid weather, spreading and radiating when the sun shines. Ovary six-angled. Pastures, and rarely in woods. Perennial. April, May. We have gathered it in Battersea Fields in full flower on the 12th of June. Alien. (See "Cybele," vol. ii., p. 458.)

2. **O. pyrenaicum**, Linn. Tall Star of Bethlehem. E. B. 103, L. C. 1088. Bulbs ovate. Leaves all radical, *very long*. Stem tall, simple, polished, stout, much longer than the leaves. Bracts scarious, acuminate. Flowers in a *long spicate cluster*, on peduncles first spreading, afterwards erect, *greenish white*, with a green band on the outside of each division. Woods and hedges south and west of England. Perennial. May.

A. 5, C. 7. Lat. 50°—53°. Alt. 0—50 yards. T. 50°—49°.

3. **O. nutans**, Linn. Drooping Star of Bethlehem. E. B. 1997, L. C. 1089. Bulbs ovate. Leaves radical, few, linear-lanceolate. Stalk erect, round, glaucous, bearing a simple, nearly upright cluster of several large flowers, which droop to one side. Peduncles shorter than the bracts. Divisions of the perianth elliptic, oblong, *silvery, glaucous, white*, greenish at the back. Fields and orchards. Naturalized. (?) Perennial. May. (See "Cybele," vol. ii., p. 458.)

VII. **Gagea**, Salisb. Yellow Star of Bethlehem. Root with a membranous tunic. Stem simple, with leafy bracts at the top. Leaves radical, linear. Flowers in terminal corymbs, rarely solitary. Perianth and stamens as in *Ornithogalum*; filaments scarcely flattened; anthers with basal attachment. Seed roundish, with a yellow testa.

Gagea lutea, Ker. E. B. 21, L. C. 1087. Bulbs small. Stems solitary, erect, angular, glabrous, four-six inches high, naked, except at the summit. Root-leaf or leaves linear-lanceolate, pointed. Stem-leaves, usually two (bracts?) under the umbel. Flowers umbellate, on long peduncles. Sepals linear-lanceolate, elongate, erect, green at the back, the inner side yellow, tipped with green. In groves and pastures; rare. Perennial. April.

A. 12, C. 20. Lat. 51°—58°. Alt. 0—200 yards. T. 49°—47°.

VIII. **Scilla**, Linn. Squill. Bulbs mostly coated, not solid. Stems simple, naked. Leaves radical, linear. Flowers without bracts, on radical stalks. Perianth in six, more or less spreading, divisions; deciduous or withering. Stamens six, filiform, attached to the base of the divisions; anthers oblong, with dorsal attachment. *Ovary* roundish, with a single deciduous style and simple stigma. *Capsule* ovate or roundish, three-celled, three-furrowed, three-valved, with central partitions. Seeds several, with a thin brittle testa.

1. **S. autumnalis**, Linn. Autumnal Squill. E. B. 78, L. C. 1092. *Bulbs large, with many linear narrow leaves, which appear after the flowers.* Stems six inches long, more or less downy, channelled, tapering, usually solitary, leafless, bearing flowers in clusters which are elongated after flowering. Bracts none. Flowers small, blue or lilac, on ascending pedicels. Seeds about two in each cell. Dry places; south of England. Moulsey Hurst, Surrey. Perennial. August, September.

A. 4, C. 8. Lat. 50°—52°. Alt. 0—50 yards. T. 52°—49°.

2. **S. verna**, Huds. Spring Squill. E. B. 23, L. C. 1091. *Bulbs small, whitish. Leaves hooded at the tips, numerous, as long as the stalk.* Stems round, erect, or wavy, four-five inches, with a terminal few-flowered corymb. Bracts lanceolate, elongate, membranous. Flowers blue. Western coasts, Hebrides, &c. Perennial. April.

A. 12, C. 25. Lat. 50°—61°. Alt. 0—300 yards. T. 52°—43°.

3. **S. bifolia**, Linn. Two-leaved Squill. E. B. 24. Bulb small,

producing few leaves (two-three). Leaves linear-lanceolate, *sheathing the base of the stem*, involute and cylindrical at the tips. Stems solitary, with a lax corymbose cluster of beautiful blue, rarely white flowers. Pedicels erect. *Ovary usually with six ovules*. Said to have been found in the west of England. Perennial. April.

Not known as a native or naturalized plant of the British Isles.

IX. *Agraphis*, Link. *Scilla*, Sm. Blue Bell. Stalks tall, round, naked. Leaves radical, keeled, reflexed and drooping above. Flowers bracteated, racemose, drooping. Perianth tubular, campanulate, of six connivent pieces. Stamens six; three attached to the inner divisions, shorter than the others, which are attached by nearly their whole length to the sepals. Style and stigma triangular. Capsule obtusely triangular, with few seeds. Seeds with a black testa.

A. nutans, Link. Wood Hyacinth. E. B. 377. *Hyacinthus non-scriptus*. Hook. L. C. 1093. Root bulbous, solid. Leaves all radical, erect, narrowed below, linear, slightly channelled. Stems usually solitary, slender, quite naked. Flowers in a reclining, one-sided cluster, each one provided with two long, coloured, linear-pointed bracts. Fruit three-celled, with about eight-ten seeds. Woods. Perennial. April, May.

A. 18, C. 80. Lat. 50°—58°. Alt. 0—600 yards. T. 52°—43°.

X. *Allium*, Linn. Garlick, Onion, Leek. Plants strong-smelling, bulbous-rooted, or producing rhizomes bearing bulbs. Stems leafless, sometimes apparently leafy. Leaves radical, flat, round, or hollow sheathing, and often apparently growing from the stem. Flowers umbellate or capitate, subtended (enclosed) by a spathe. Divisions of the perianth free or cohering; persistent, converging, or spreading. Stamens inserted at the base of the divisions; filaments often connected by their dilated bases, with a lateral tooth or filiform appendage. Fruit small, triangular, three-celled; cells one-two-seeded. Seeds angular, with a black brittle shagreen-like testa.

SECT. I.—Root a single bulb. Leaves flat, lanceolate, or oblong. Stems never apparently leafy. Divisions of the perianth spreading radiately. Filaments entire.

1. A. ursinum, Linn. Ramsons. E. B. 122, L. C. 1086. Bulb oblong, with a white pellucid tunic. Stems slender, obscurely three-angled. Leaves two, large, oblong-lanceolate, tapering into a long petiole, and forming a sheath surrounding the lower part of the stem, and also the petiole of the undeveloped leaf. Spathe membranous, pellucid. Flowers pure white, in an umbel, with a strong, disagreeable garlick smell, falling off when the fruit ripens. Stamens shorter than the perianth. Woods and hedges. Perennial. May. Hendon, Middlesex.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—46°.

SECT. II.—Root consisting either of one solitary or of several bulbs in a tuft. Leaves cylindrical, hollow, half cylindrical, channelled or flat. Stem

apparently leafy. Divisions of the perianth either spreading or converging and forming a bell-shaped flower. Stamens entire.

2. **A. oleraceum**, Linn. Streaked Field Garlic. E. B. 488, L. C. 1082. Bulb round-ovate. Stem round, leafy below. Leaves hollow, nearly round, channelled above, ribbed below. Bracts dilated and concave at the base, the lower one ending in a very long point. Flowers in a lax umbel, of a *rosy white, streaked with green and red*, intermixed with bulbils. Divisions of the perianth obtuse. *Stamens about as long as the perianth*, without teeth. Borders of fields. Perennial. July.

A. 9, C. 20. Lat. 50°—57°. Alt. 0—200 yards. T. 50°—46°.

Var. *β. complanatum*, Fries; *carinatum*, Smith. E. B. 1658. Leaves flat, not hollow, concave above, with long ribbed sheaths. Stamens shorter than the perianth. North of England; in mountainous situations. Perennial. July.

3. **A. schœnoprasum**, Linn. Chives. E. B. 2441, L. C. 1085. Bulbs slender, in dense tufts. Stems erect, leafy at the base. Leaves hollow, linear, pointed, round or flattened. Flowers *rosy-purple*, on short pedicels, in a roundish umbel, *not intermixed with bulbils*. Divisions of the perianth lanceolate, pointed. Stamens shorter than the perianth, without teeth. Meadows and pastures, in mountainous places; common in cottage gardens.

A. 2, C. 2. Lat. 50°—56°. Alt. 0—100 yards. T. 52°—47°.

β. arcuatum. Stem taller than in the type, six inches to two feet high. Leaves curved and bending downwards. Rocks and cliffs near the sea; Cornwall. Perennial. June.

SECT. III.—Roots usually solitary bulbs. Leaves hollow, channelled, or flat. Stem apparently leafy. Divisions of the perianth converging. Stamens flat, with toothed appendages, which often surpass the anther.

4. **A. vineale**, Linn. Crow Garlic. E. B. 1974, L. C. 1083. Bulbs small, with pedicelled bulbils, enveloped in the same coat. Stem round, leafy up as far as the middle. Leaves *cylindrical, fistular*, with narrow furrows above. Spathe ovate, short, abruptly pointed. Flowers in a lax umbel, intermixed with numerous bulbils, which are ovate, or oblong-pointed. Stamens *longer than the perianth*, the three inner with subulate appendages, the anther-bearing point half as long as the barren filament. Dry fields, chalk pits, waste ground, &c. Perennial. June—August.

A. 14, C. 50. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

Var. *β. Compactum*. Umbel consisting of bulbs only, head terminates in a leaf-like point.

5. **A. scordoprasum**, Linn. *A. arenarium*, Eng. Flora. Sand Garlic. E. B. 1358, L. C. 1081. Bulbs small, with many purplish offsets. Stems erect, leafy, two-three feet high. *Leaves flat*, broad, rough at the edges. Bracts membranous, short, with an abrupt point. Flowers purple, in a lax umbel on long pedicels, intermixed with numerous dark-purple, ovate, pointed bulbs. Segments

of the perianth with a point and rough keel. *Stamens shorter than the perianth*; the three inner with pointed teeth. Mountainous woods and fields, in a sandy soil. North of England. Perennial. July.

A. 7, C. 12. Lat. 53°—57°. Alt. 0—200 yards. T. 48°—46°.

6. **A. sphærocephalum**, Linn. Round-headed Garlic. E. B. 2813, L. C. 1084. Bulbs small, with several offsets. Stems round, leafy below. *Leaves linear, round, hollow, channelled above*. Bracts membranous, short. *Flowers rose-coloured, red-purple*, numerous, on short pedicels in a round, compact umbel, usually without bulbs. Perianth somewhat angular, close. Stamens longer than the perianth, the three inner ones toothed. Dry, stony, or rocky places. South of England, St. Vincent's Rocks, Bristol. Perennial. July.

A. 1, C. 1. Lat. 51°—52°. Alt. 0—50 yards. T. 50°—49°.

7. **A. Ampeloprasum**, Linn. Tall Garlic. E. B. 1656, L. C. 1079. Stems stout, round, leafy to the middle, two-six feet high. *Leaves flat*, keeled, acuminate, with an elongate spathe. Perianth pale purple, without bulbs. Flowers in a round, compact umbel. Keel of petals rough. Three alternate anther-bearing stamens, furnished with long, slender points one on each side of the anther. Fruit globular. Cliffs, Guernsey; Steep Holmes, Severn. Perennial. August. Alien in England. (See "Cybele," vol. ii., p. 451.)

8. **A. Babingtonii**, (Bor.) E. B. 2906. This species or variety differs from the above in having a *loose, irregular umbel*, mostly bulbiferous, and the anther-bearing point is *incurved at the apex when young*. We have seen them both growing together, but there was no very striking difference between them when in this state.

Grows with *A. Ampeloprasum* in Great Arran Island. Mr. Andrews.

9. **A. triquetrum**. Stem triangular, with nearly flat or slightly rounded sides. Leaves linear, sharply folded and keeled; spathe two-valved, about as long as the erect lax umbel. Segments of the perianth oblong, white, with a slender green midrib. Stamens half as long as the segments. Hedges in the island of Guernsey. Communicated by the Rev. T. Galway to Mr. Babington, "Botanical Gazette," vol. i., p. 6.

Sarnian (A Channel Islands' plant.)

XI. **Muscari**, Tourn. Grape Hyacinth. Bulbs tunicated. Leaves radical, sometimes sheathing the base of the stem. Flowers in a terminal spike-like cluster, the upper flowers often barren. Perianth oval-round or cylindrical-urceolate, with a short six-toothed limb. Stamens six, included in the tube of the perianth; anthers dorsally attached above their base. Style slender, short; stigma somewhat angular. Fruit capsular, with three acute angles, cells two-seeded or one-seeded by abortion. Seeds roundish or slightly angular.

M. racemosum, Mill. Grape Hyacinth. E. B. 1231, L. C.

1094. Stems round, erect, quite naked, nine-twelve inches high. Leaves *linear*, narrow channelled, narrowing at the base, erect, often longer than the stem. Flowers deep blue, with a glaucous bloom (efflorescence), roundish-ovate, in dense terminal short ovate clusters; upper flowers barren, almost sessile. Fruit large, triangular, spreading. On the Roman wall at Colchester. Perennial. May.

Alien. (See "Cybele.") "I have seen it in great abundance on the ruins of the old wall at Colchester, not far from St. Mary's Church."—A. I.

SUB-TRIBE II.—**Anthericeæ.**

XII. *Narthecium*, Huds. Bog-Asphodel. Root creeping. Stem simple, leafy. Leaves sword-shaped. Flowers terminal, erect, racemose. Sepals six, linear-lanceolate, spreading, coloured, permanent, three exterior; all finally hardening and converging round the capsule. Stamens six, opposite to the sepals, woolly and permanent, with oblong, converging anthers. Ovary oblong, three-angled, tapering into a short style. Capsule three-furrowed, three-celled, three-valved, with central partitions. Seeds numerous, small, oblong, with an appendage at each end.

***N. ossifragum*, Huds.** Lancashire Bog-Asphodel. E. B. 535, L. C. 1175. Root tuberous, creeping. Stem erect, slightly bent at the base, leafy, six-twelve inches high, with wide sheaths, which are topped with a short leaf-like crown or bract. Leaves radical, in tufts nearly as long as the stem, in two ranks, sword-shaped. Flowers solitary, alternate on short pedicels, in a more or less dense cluster, each with a lanceolate bract under the pedicel, and a smaller one above. Sepals bright yellow above, green below. Fruit tawny, partly covered by the converging sepals. Turfy bogs. Perennial. June.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—1100 yards. T. 52°—36°. *Simethis bicolor*. (See tribe *Tulipeæ*, ante.)

ORDER XXV.—**ASPARAGACEÆ**, Rich. THE ASPARAGUS FAMILY.

Herbaceous, rarely woody plants. Roots creeping or tufted. Stems simple, or rarely branching. Leaves scattered, opposite, or whorled or in radical tufts, sessile or sheathing, rarely petioled. Flowers perfect, not large, axillary or terminal, solitary, or in tufts or clusters. Perianth caducous, rarely persistent, in six, rarely four divisions, free or united. Stamens six, rarely four-three, hypogynous or inserted on the perianth. Anthers with basal attachment, or nearly so. Ovary free, of three carpels, with few or many ovules. Styles united, rarely free. Fruit baccate or fleshy, many or few-seeded, sometimes one-celled and one-seeded by abortion. Seeds roundish, with a thin membranous testa. Albumen thick, fleshy, or horny. Embryo very small, often distant from the hilum.

SYNOPSIS OF THE GENERA.

Asparagus. Stem branching. Leaves reduced to scales. Flowers dioecious by abortion. Stigmas three, reflexed.

Convallaria. Leaves elliptical-oval, acuminate, radical. Flowers perfect on radical peduncles, campanulate-urceolate. Stamens inserted at the base of the perianth. Stigma simple, angular.

Polygonatum. Stem leafy, curved. Stamens inserted about the middle of the perianth.

Maianthemum. Stem simple, erect, leafy. Perianth in four divisions. Stamens four.

Ruscus. Stem branching, woody. Flowers small, unisexual, in six divisions on the surface of the flattened branches. Stamens three.

I. *Asparagus*, Linn. *Asparagus*. Herbs or shrubs, with branching stems; a state very uncommon in monocotyledonous plants, excepting certain aquatic genera. Leaves linear, narrow, or reduced to scales, tufted. Flowers lateral, axillary and drooping. Perianth six-parted, deciduous, *permanent* (Smith). Stamens six, much shorter than the segments to the base of which they are attached. Anthers peltate, erect. Ovary globular, with three-furrowed, short style and three-lobed spreading stigma. Fruit, a berry subtended by the withered perianth, three-celled, one or two being often abortive. *Seeds* one or two in each cell. Flowers dicecious by abortion. The virgate (rod-like), very bushy stems, and the berried fruit will be quite sufficient for the identification of this genus.

A. *officinalis*, Linn. Common *Asparagus*. E. B. 339, L. C. 1096. Roots somewhat creeping, with long fleshy fibres with a densely scaly crown. Stems round, branching, with round slender branches. Branchlets (leaves) setaceous, tufted, or whorled, short, subtended by minute scarious or membranous bracts. Flowers yellowish-green in pairs, stalked, drooping, bell-shaped. Fruit a beautiful red berry. West and south of England; the wild state of the Garden *Asparagus*. Perennial. June, July. Fruit: August—October.

A. 6, C. 10. Lat. 50°—54°. Alt. 0. T. 52°—49°.

II. *Convallaria*, Linn. in part. Lily of the Valley. Leaves all radical in twos, surrounded at the base by scaly sheaths. Flowers white in a terminal cluster on a radical peduncle. Perianth campanulate with six reflected segments (teeth). Stamens six, inserted at the base. Ovary three-celled, with two ovules in each. Style simple. Stigma obtuse, angular.



Fig. 124.—1, *Convallaria majalis*; a, root; b, part of the stalk with flowers. 2, Section of flower; p, perianth, magnified; ts, stamens, ditto; o, ovary, ditto. 3, Fruit. 4, Transverse section of the fruit.

C. maialis, Linn. Lily of the Valley. E. B. 1035, L. C. 1099. Roots horizontal, branching, creeping widely, producing at the raised joints strong radical fibres and tufts of leaves and stems. Lower leaves rudimentary, clasping the stem; upper leaves two-three, elliptical, pointed, of a beautiful green. Stem lateral, bearing a lax cluster of about six-eight flowers inclining to one side. Flowers snow-white, rounded and inflated at the base, contracted towards the top, with six mostly reflexed teeth. In woods, chiefly on the clay, sometimes on gravel. Perennial.

A. 12, C. 30. Lat. 50°—58°. Alt. 0—200 yards. T. 49°—46°.

III. Polygonatum, Desf. Solomon's Seal. Roots creeping. Stems leafy, curved. Leaves alternate on one side of the stem. Flowers



Fig. 125.—*Polygonatum vulgare*. 1, Entire plant much diminished; 2, entire flower; 3, section of the same; 4, pistil; 5, transverse section of ovary; 6, fruit entire; 7, section of six; 8, section of six, showing the position of the embryo.

pendulous, axillary, on short peduncles on the side of the stem opposite to the leaves. *Perianth* tubular, cylindrical, with a six-cleft, spreading limb and obtuse segments. Stamens six, shorter than the tube, into the middle of which they are inserted. Anthers erect, cleft. *Ovary* roundish. *Style* triangular, swelling upwards. *Stigma* obtuse, triangular. *Fruit* a three-celled, two-seeded berry. The fibrous roots, rigid stems (scape in *C. majalis*), handsome, rather rigid foliage, and the baccate fruit will in general be sufficient to determine this genus.

1. **P. vulgare**, Desf. *Convallaria Polygonatum*, Linn. Common Solomon's Seal. E. B. 280, L. C. 1102. Root fleshy, horizontal, creeping. Stem robust, erect and leafless at the base, drooping and leafy above, angular or slightly winged and furrowed, with membranous

sheaths at the base. Leaves ovate-oblong, alternate, prominently ribbed or plaited, nearly sessile. Flowers solitary, drooping on short slender pedicels, conical, white, with a green limb. Filaments smooth. Berry dark blue. Woods and shady places; rare. Perennial. Flowers in May; is in fruit in September.

A. 7, C. 10. Lat. 51°—56°. Alt. 0—200 yards. T. 49°—46°.

2. **P. multiflorum**, Desf. *C. multiflora*, Linn. Many-flowered Solomon's Sea. E. B. 279, L. C. 1101. Stems round, erect, arched,

stout, simple, angular, rigid, and furrowed, leafy. Leaves *elliptical elongate*, prominently ribbed below, half clasping, *glaucous*, especially on the under side. Peduncles three-five-flowered. Flowers smaller than in the preceding, axillary on a common three-five-flowered peduncle, *with hairy stamens*.

3. **P. verticillatum**, Desf. *C. verticillata*, Linn. Narrow-leaved Solomon's Seal. E. B. 128, L. C. 1100. Stems erect, angular, smooth, leafy above. Leaves *linear-lanceolate*, whorled, three-five in a whorl. Flowers two-four on a common pedicel. *Stamens short, berries red*. Woods, north of England and Scotland; very rare. Perennial. June.

A. 2, C. 3. Lat. 55°—57°. Alt. 0—200 yards. T. 47°—46°.

IV. **Maianthemum**, Wigg. Stem simple, leafy. Flowers small, white, in a terminal cluster. Perianth four-parted; divisions free to the base, spreading or reflected. Stamens four, at the base of the divisions of the perianth. Ovary two-three celled, with one or two ovules in each. Style simple, stigma blunt, obscurely two-three lobed.

M. bifolium, D. C. Roots spreading widely and horizontally. Stem angular, bent, where the lower and upper leaves originate. Leaves alternate, usually two, on short petioles, cordate, with large lobes, acuminate, sharp, with prominent hairy ribs and ciliated margins, especially at the base. The radical leaves (barren stems?) on long petioles. Flowers pedicelled, usually two together, in a terminal, erect cluster. Divisions of the perianth ovate. Fruit a red berry. Woods and shady places. Caen Wood, Hampstead, Middlesex, where it was observed about twenty-five years ago, and at that time the oldest gardener of the place stated that it had occupied the same spot for fifty years; another smaller patch was observed nearer the lake. The plant exclusively occupies about a rod of ground. Perennial. May.

Alien or unknown as a British plant. (See "Cybele," vol. ii., p. 465.) "It is now above twenty-six years since I first noticed this plant in *two* spots in Caen Wood, Hampstead, Middlesex. When I showed it to Mr. Colborn, the gardener, he informed me that it was no discovery, for it had been known there 'time out of mind.' I have repeatedly visited this locality since, and three years ago I observed that the smaller patch had disappeared, and that the second and larger one, near the summit of the hill, had increased, probably doubled its area since I first noticed it."—A. I.

V. **Ruscus**, Linn. Butcher's Broom. Roots perennial. *Stems* biennial, branching. Whole plant rigid, evergreen. Flowers lateral, monœcious or diœcious. Solitary flowers borne on the elliptical, pungent leaves (flattened branches). Perianth in six divisions. Stamens three, combined at the base, with three sessile anthers. Ovary three-celled, with two ovules in each. Style short; stigma obtuse. *Fruit* a globular succulent berry of three cells, and rarely more than

one seed. The shrubby evergreen habit, prickly leaves, bearing the flowers on their upper surface, and the berried fruit sufficiently characterise this genus.

R. aculeatus, Linn. Butcher's Broom. E. B. 560, L. C. 1097. Low, evergreen shrub. Stems of two years' duration, rigid, branching. Leaves ovate, acute, sessile, thick, leathery, acuminate and terminated with a long prickly point, with prominent midrib, and several secondary curved nerves. Flowers dioecious by abortion, sessile on the prominent midrib, subtended by a scarious pointed bract. Fruit large red, berries permanent. Seeds large, globular. Woods and bushy places. April.

A. 8, C. 20. Lat. 50°—55° (56°). Alt. 0—200 yards. T. 52°—47°.

ORDER XXVI.—**TRILLIACEÆ**. THE TRILLIUM FAMILY.

Stems simple, rhizomatous, with whorled leaves. Flowers terminal. Outer sepals three-four, herbaceous, inner ones three-four-coloured, or herbaceous. Stamens six-ten, hypogynous. Ovary three-four-five-celled, with as many styles. Fruit baccate, three-five celled, many-seeded. The single-flowered stem, whorled leaves (from four to six), and baccate fruit distinguish the sole British species of this order.



Fig. 126.—Trilliaceæ. 1, *Paris quadrifolia*. 2, Flower; *p*, perianth, four leaves broader, and four ditto alternate, narrower; *st*, stamens; *o*, ovary. 3, Ovary and styles magnified. 4, Fruit. 5, Section of ovary.

a four-celled berry, with several globose seeds in two rows attached to a central placenta.

P. quadrifolia, Linn. Herb Paris. One Berry. E. B. 7, L. C. 1103. Root widely and horizontally creeping. Stems erect, leafy only at the top. Leaves whorled, usually in fours, or rarely in fives and sixes, sessile, ovate, or oblong-roundish, pointed. nar-

Paris, Linn. Herb Paris. Roots creeping. Stems simple, bearing four-six whorled leaves. Flower single. Perianth herbaceous, of four outer lanceolate, acute-spreading sepals, and four alternate linear inner ones; all persistent. Stamens eight, with long linear anthers, which are dorsally attached to the middle of the filaments, with an elongated connective. Ovary roundish, four-furrowed, with four spreading styles. Stigmas downy at the upper side. Fruit

rowed at the base. Flower large, green, pedicelled in the centre of the whorl (involucre). Outer divisions of the perianth lanceolate, inner linear. Fruit a bluish black berry. Woods, chiefly on a chalky soil. Perennial. May.

A. 15, C. 50. Lat. 50°—58°. Alt. 0—200 yards. T. 50°—47°.

†† Ovary united with the perianth (inferior).

Hydrocharidaceæ are distinguished by their aquatic habitats, and by their swimming and floating habit. *Orchidaceæ* by their erect habit, and curiously-shaped flowers. *Amaryllidaceæ* by their linear leaves, and regular showy blossoms. *Iridaceæ* by the three stamens, &c. *Dioscoreaceæ* by their dilated leaves with branching nerves, and by their twining habit.

ORDER XXVII.—**HYDROCHARIDACEÆ.**
Rich. THE FROGBIT FAMILY.

Aquatics, submersed or submersed-floating. Flowers dioecious, in a spathe (bract) before opening. Perianth in six divisions, in two rows; the outer three pieces herbaceous, the inner three coloured. Stamens inserted at the base of the perianth three-six-nine-twelve, or fewer by abortion, with a rudimentary ovary. Female flowers solitary (the males are usually aggregate), the outer divisions united at the base forming a tube continuous with the ovary, with barren filaments. Ovary adherent, one-three-six-celled, with ovules on the partitions or on the walls of the one-celled ovary. Style short. Stigmas three-six, more or less deeply cleft. Fruit ripening under water, many-seeded, fleshy, not opening, one-celled, or six-celled, with membranous partitions. Seeds with a membranous testa. No albumen. Embryo cylindrical. Radicle directed towards the hilum.

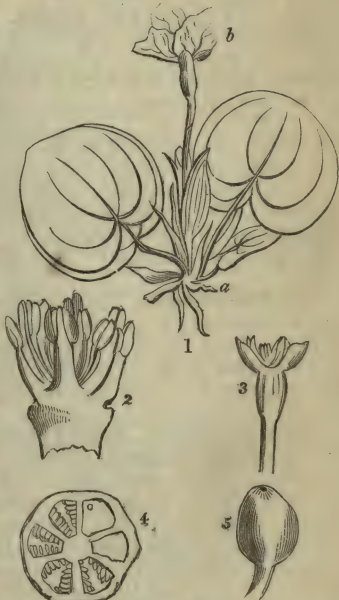


Fig. 127.—*Hydrocharis morsus rane*. *a*, root and leaves; *b*, flower. 2, male flower and stamens magnified; 3, female ditto; 4, section of ovary; 5, fruit natural size.

SYNOPSIS OF THE GENERA.

Hydrocharis. Leaves petiolate, cordate, floating. Flowers conspicuous.

Anacharis. Leaves sessile, ovate or lanceolate, submersed; flowers inconspicuous.

Stratiotes. Leaves erect, sword-shaped.

I. *Hydrocharis*, Linn. Frogbit. A floating aquatic. Stem none, or represented by floating runners. Leaves entire, stalked. Flowers on radical stalks, dicecious. Male flowers in a spathe. Perianth of six segments, the three outer small and green, the three inner large and coloured. Stamens nine-twelve, in three or four rows, with two-lobed anthers. Female flowers in a single-flowered spathe. Perianth as in the male flowers. Ovary roundish, with thick short style, and six cloven, acute stigmas. Capsule globular coriaceous, six-celled, containing numerous minute seeds. The heart-shaped floating leaves, the floating runners by which the plant increases, and the delicate white flowers, characterise the only known species of the genus.

H. *morsus-ranæ*, Linn. Common Frogbit. E. B. 808, L. C. 1107. (See Fig. 127.) Stem slender, variable in length, throwing out radical fibres opposite to the tufts of leaves. Leaves on long petioles, roundish-reniform, thick, shining, convolute in prefoliation. Stipules oblong-lanceolate, large, united with the petiole at their base. Flowers axillary, inner divisions white, yellow at the base. Ponds and ditches. Perennial. July.

A. 11, C. 30. Lat. 50°—55°. Alt. 0—100 yards. T. 51°—47°.

II. *Anacharis*, Reich. American Water-weed. Dicecious. Calyx three-parted. Petals three. Male flowers, sepals ovate, oblong. Petals linear or none. Stamens nine. Filaments combined into a column below. Female flowers, long filiform tubes, with three abortive filaments, and ligulate stigmas. Capsule one-celled, two-seeded.

A. *alsinastrium*, Bab. Chickweed-like American Water-weed. Stems submersed, slender, round, branching, leafy, finely striated. Leaves somewhat ovate, rounded at the base, tapering, lanceolate, three-five-nerved, clasping the stem, entire. Flowers on axillary peduncles, solitary. Calyx in three segments, green. Petals three, small, white. Styles three. Only the fertile flowers have as yet been detected in this country. Ditches and ponds, in many places. Not observed in England till about ten years ago. It is now far too common, having become a great pest in the Fens. (See "Phytologist," vol. ii., p. 194, Sept., 1857.) Perennial. July.

The area of this plant is not yet determined; though it is likely to be found from the Land's End to Cape Wrath. Originally discovered by Miss Kirby in the canal near Market Harborough, in Leicestershire, in 1847.

III. *Stratiotes*, Linn. Water-Soldier, or Water-Aloe. Aquatics, with radical, simple, serrated, or entire leaves. Flowers single, spathaceous, white, on radical stalks. Perianth tubular, six-parted, the three outer pieces herbaceous, deciduous, three inner white, larger.

Stamens, about twenty, on the top of the tube of the perianth, with vertical anthers. Ovary elliptical, bluntly angular. Styles united with six deeply cleft stigmas. Fruit fleshy, with six or more cells, and as many angles. *Seeds* numerous, in two rows. This genus is represented in England by only one plant, which is readily known by its bayonet-shaped (three-angled), strongly serrated leaves united in tufts, with a central, strong, upright flower-stalk, bearing a single white flower. After flowering the plant sinks to the bottom, where it produces long, simple runners, each ending in a leaf-bud, which roots in the mud, and the following summer rises to the surface, where it flowers, and again sinks to the bottom to ripen its seeds. It is probable that the air contained in the highly vascular leaves assists the plant in floating up to the surface of the water.

S. aloides, Linn. Fresh-water Soldier. E. B. 379, L. C. 1108. Leaves seven-twelve inches long, triangular sword-shaped, pointed, very vascular, and fringed with sharp teeth. Flower-stalk firm, stout, two edged, shorter than the leaves, bearing a large white flower. This plant grows in the fen ditches of Norfolk, Cambridgeshire, and the eastern counties generally. Perennial. July.

A. 4, C. 10. Lat. 52° — 54° . Alt. 0—100 yards. T. 49° — 47° .

Note.—This plant, with *Villarsia nymphaeoides*, has been established for many years in ponds on Wandsworth Common, not far from the Railway Station. British botanists are indebted to the late Mr. Anderson, curator of the Chelsea Botanic Garden, for this addition to the rare plants growing near the metropolis.

ORDER XXVIII.—**ORCHIDACEÆ**, Juss. THE ORCHIS FAMILY.

Root fleshy, whether fibrous or bulbous, rarely creeping. Stems simple, usually leafy, always so at the base. Leaves alternate, sheathing, sometimes reduced to scales. Flowers perfect, spiked, or in a terminal cluster, each furnished with a bract. Tube of the perianth united with the ovary, with six coloured withering divisions, three outer and three inner; the three outer often converging with two of the inner, forming the hood or helmet; the third inner division (lip) is usually very different from the others, often bearing a spur. Stamens three, filaments united with the style and stigma in a column (*gynosteme* or *gynostemium*), the two lateral barren, the central one perfect, placed above the stigma. Anthers two-lobed, with pollen agglomerated in masses, like wax, or in agglutinated granules, attenuated into a pedicel, sometimes slightly cohering, or almost pulverulent. Ovary adherent to the tube of the perianth of three one-celled carpels, each containing many ovules, with parietal attachment. Stigma a glandulous surface at the apex of the column (stamens and style). Fruit capsular, three or six-angled, three-valved; usually crowned by the withering perianth, one-celled, many-seeded, opening by three longitudinal clefts (fents). Seeds minute, with a loose reticulate testa.

TRIBE I.—**Malaxideæ**. Root of one or several bulbs, or of fleshy fibres. Terminal anther free; pollen-masses very compact, waxy, not attenuated into a pedicel.

SYNOPSIS OF THE GENERA.

Corallorhiza. Roots thick fleshy fibres. Perianth converging.

Liparis. Roots bulbous. Perianth spreading. Anther without a terminal appendage.

Malaxis. Roots bulbous. Perianth spreading. Anther with a terminal membranous appendage.

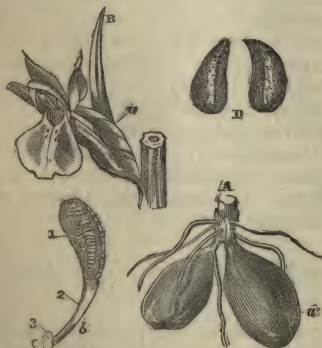
I. **Corallorhiza**, Br. Coral Root. Root tuberous, with fibrous radicles. Stems erect, leafless, with a few sheathing scale-like bracts. Outer divisions of the perianth lanceolate, equal, inner ones oblong or lanceolate. Lip three-lobed, the lateral lobes small, the central large, slightly notched, with a short spur. Column elongated. Anthers terminal, two-celled. Ovary elliptic, oblong, not twisted, slightly pedicelled.

C. innata, Br. Spurless Coral Root. E. B. 1547, L. C. 1044. Root fleshy, with the scent of vanilla when drying. Stems erect, angular, smooth, naked, except a few sheathing scales, six-ten inches high. Spike lax, oblong, short, more or less glandular. Flowers yellowish. Outer divisions lanceolate, spreading, greenish; inner ones pale yellow, converging. Lip oblong, white

or pale yellow, spotted with red, without a spur. Ovary elliptical, crowned with the withered flower. Shady woods in Scotland. Perennial. June.

A. 4, C. 7. Lat. 55°—58°. Alt. 0—200 yards. T. 48°—46°.

II. **Liparis**, Rich. *Sturmia*, Reich. *Malaxis*, Sm. Outer divisions of the perianth narrow, spreading, the two lateral contiguous to the lip; the two inner divisions nearly equal to the outer; lip broader and larger than the outer divisions, entire, erect or spreading, not spurred. Column elongated. Anther terminal, sessile, deciduous, with a membranous terminal appendage. Pollen-masses two-parted, with collateral lobes. Ovary scarcely twisted, on a twisted pedicel.



L. Loeselii, Rich. Two-leaved Bog Orchis. E. B. 47, L. C. 1064. Stem six-ten inches high, with sharp angles, three-angled at the top, nearly leafless, with two radical, sheathing, basal leaves. Leaves oblong, or oblong-lanceolate, plicate, membranous, yellowish green. Flowers small, yellowish, erect, in a lax, three-ten-flowered spike. Lip ovate, obtuse, coloured like the other divisions. Spongy bogs; east of England; very rare. Perennial. June.

A. 2, C. 5. Lat. 51°—53°. Alt. 0. T. 50°—48°.

III. Malaxis. Swartz. Bog Orchis. Outer divisions spreading, as in *Liparis*, the two inner divisions much smaller. Lip short, erect, entire, concave, embracing the column. Column very short, anther terminal, sessile, persistent, without a terminal appendage. Pollen-masses two-parted, united at the apex. Ovary not twisted, tapering into a twisted pedicel.

M. paludosa, Sw. Marsh Bog Orchis. E. B. 72, L. C. 1063. Bulbs ovate, distant. Stems erect, slender, three-six inches high, angular, with two-four leaves near the base. Leaves obovate, yellowish green, fringed at the end with buds. Flowers in a long slender spike, yellowish green, erect, on pedicels as long as the ovary subtended with herbaceous yellowish bracts. Lip green, ovate, pointed, erect; outer divisions of the perianth ovate, spreading, two of them embracing the base of the lip, which consequently assumes an upward direction. Bog at Hampton Lodge, Puttenham, near Guildford, Surrey; Mr. J. D. Salmon. In spongy, mossy bogs, growing among or on the moss. ("Phytologist," vol. ii., pp. 42, 79.) Perennial. August, September.

A. 15, C. 40. Lat. 50°—59°. Alt. 0—400 yards. T. 50°—43°.

TRIBE II.—Arethusiæ. Anther deciduous; pollen pulpy or powdery, in two-stalked masses; lip with a spur.

IV. Epipogium, Sw. (*Epipogum*, Linn). Sepals spreading. Lip large, entire, with small, spreading, basal lobes. Spur erect, inflated. Anthers tumid, on the lobed top of the column. Stigma transverse. Ovary not twisted.

E. apyllum, Sw. Leafless Epipogium. Rehb. Fl. Ger., xiii., 468. Stem three-seven inches high, sheathed, leafless. Pieces of the perianth lanceolate, narrow, acute, yellowish. Mid-lobe ovate, furrowed, with four rows of purple tubercles. Spur very thick (Babington). Damp woods. Tedstone, Delamere, Herefordshire. Rev. W. A. Smith. (See "Phytologist," N.S., vol. i., p. 118.) Perennial. August.

TRIBE III.—Ophrydeæ. Root fleshy, bulbous entire or palmate, with radical fibres. Stems leafy; anther continuous with the column. Mass of pollen agglutinated and attenuated into a pedicel.

SYNOPSIS OF THE GENERA.

Orchis. Outer divisions converging or spreading; lip with a spur.

Ophrys. Outer divisions of the perianth spreading; lip thick, without a spur.

Gymnadenia. Lateral outer divisions (sepals) spreading, the upper converging and forming a hood; lip with a spur.

Habenaria. (*Platanthera*, Rich.) Lateral divisions spreading, the upper connivent, lip elongated, with a very long spur.

Hermidium. Divisions erect, forming a campanulate perianth, lip without a spur.

Aceras. Outer and inner divisions connivent, forming a hood; lip in three linear divisions without a spur.

V. Orchis, Linn. *Orchis*. The two outer and lateral divisions of the perianth converging or spreading, the upper one connivent with the two interior divisions forming a hood or casque; lip spreading, furnished with a spur, three-lobed, the middle one entire or two-lobed or cleft. Anthers erect, with contiguous parallel lobes. Stamminodes (barren stamens) small, obtuse, ovary twisted.

SECT. I.—Pedicels of the pollen-masses separate.

1. ***O. ustulata***, Linn. Dwarf Dark-winged Orchis. E. B. 18, L. C. 1048. Bulbs entire, ovate or roundish. Stem four-eight inches long. Leaves oblong-lanceolate. Bracts coloured, nearly as long as the ovary, *with a single nerve*. Flowers small, in an ovate or oblong close spike, hood dark purple, lip white, with purple spots. Outer divisions of the perianth *conniving, forming a round hood, distinct*; inner divisions linear, somewhat spatulate. Lip three-parted; lateral lobes oblong, spreading, middle lobe cleft with spreading lobes. Spur much shorter than the ovary. Chalky hills, south of England. Perennial. May.

A. 9, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—48°.

2. ***O. fusca***, Linn. Great Brown-winged Orchis. E. B. 16, L. C. 1049*. Bulbs entire, large, roundish. Stem leafy. Leaves broad, oblong. Bracts very minute, membranous, with a single more or less distinct nerve. Flowers in a large ovate or oblong spike. Hood (casque) deep purple, spotted or nerved, ovate or roundish, the three outer divisions slightly adhering to each other, and also to the two inner linear divisions. Lip three-parted, the lateral lobes linear; middle lobe broad, cleft or notched, usually with a tooth in the angle; lobes crenulate or toothed. Spur curved, truncate, less than half as long as the ovary. Chalky hills, Kent. Perennial. May.

A. 2, C. 7. Lat. 51°—52°. Alt. 0—100 yards. T. 49°—48°.

Note.—This is also the range of *O. militaris* and *O. tephrosanthos*.* (See "Cybele," vol. ii., p. 424, 425.)

3. ***O. militaris***, Linn. Military Orchis. E. B. 2675, L. C. 1049. Bulbs ovate. Stem erect, slender, leafy. Leaves narrow, more lanceolate, and more acute than in *O. fusca*. Sepals acuminate, converging, pale purple or ash-coloured. Lip four-lobed, basal lobes long, linear, diverging, distant from the two-rounded broader middle lobes. Spotted with raised dark points. Spur curved, blunt, not half

so long as the ovary. Berkshire, near Streatly, and on the opposite side of the Thames, in Oxfordshire, about Whitchurch. Perennial. June.

A. 2, C. 7. Lat. 51° — 52° . Alt. 0—100 yards. T. 49° — 48° .

4. **O. tephrosanthos**, Bich. *O. macra*, Lind. E. B. 1873, L. C. 1049*. Stem slenderer than in the preceding. This species or form is chiefly distinguishable from *O. militaris* by the lobes of the lip. Sir J. E. Smith, who appears to have studied these three forms, and to have understood their distinctive characters *well*, remarks that "the only characteristic distinction is in the *lip*, which is deeply divided into four linear, obtuse, equal and uniform, purplish segments, with a small intermediate point." The same excellent author concludes, from long observation and frequent examination, that these three forms, 2, 3, and 4, constitute but one species; and that the two extreme states, *O. fusca* and *O. tephrosanthos* are united by the varieties of *O. militaris*. Both these species (3 and 4) grow in Berkshire, near Streatly, also on the opposite side of the river in Oxfordshire. Perennial. June.

A. 2, C. 7. Lat. 51° — 52° . Alt. 0—100 yards. T. 49° — 48° .

5. **O. morio**, Linn. Green-winged Meadow Orchis. E. B. 2059, L. C. 1045. Bulbs entire, roundish. Stems leafy. Leaves oblong, or oblong-lanceolate. Bracts as long as the ovary, membranous, coloured, with one nerve. Flowers in an ovate or oblong spike, hood with green veins, lip whitish, with large lilac spots. Outer divisions converging, obtuse, free to the base, forming a roundish hood. In meadows. Perennial. May.

A. 11, C. 40. Lat. 50° — 55° . Alt. 0—200 yards. T. 51° — 47° .

6. **O. mascula**, Linn. Early Purple Orchis. E. B. 631. L. C. 1046. (See Fig. 128, p. 312.) Bulbs entire, ovate. Stem leafy below, naked above, with only two-three sheathing, membranous scales. Leaves oblong, or oblong-lanceolate, usually with black patches. Bracts membranous, coloured, as long as the ovary. Flowers in a lax spike, purple, rarely white. Outer divisions of the perianth free, the two lateral spreading or reflected. Lip three-lobed, the centre one notched, spur ascending or horizontal, cylindrical, obtuse, about as long as the ovary. Woods. Perennial. April, May.

A. 18, C. 80. Lat. 50° — 61° . Alt. 0—600 yards. T. 52° — 43° .

7. **O. laxiflora**, Lam. Lax-flowered Orchis. E. B. 2828, L. C. 1047. Bulbs round, entire; stems eighteen inches to two feet or more in height, leafy. Leaves lanceolate or linear-lanceolate. Flowers bright purple, in long, lax spikes. Lateral sepals reflexed; lateral lobes of the lip rounded and crenulate, longer than the truncate, intermediate lobe. Germer (fruit) with a short cylindrical spur. Wet meadows in Jersey. Perennial. May, June.

Sarnian (Channel Isles).

8. **O. maculata**, Linn. Spotted-leaved Orchis. E. B. 632, L. C. 1053. Bulbs palmate. Stem twelve-eighteen inches high, *not hollow*. Leaves oblong, or oblong-lanceolate, *tapering at both ends*, marked with black spots. *Bracts usually shorter than the flowers*, as long or

longer than the ovary, herbaceous, linear, pointed, with *three very distinct nerves*. Flowers in a dense, not long, spike, white veined or spotted with purple or violet. Outer divisions of the perianth lanceolate, free, the two lateral spreading. Lip large, flat, with three shallow notches; the mid-lobe entire, smaller than the two lateral ones, which are crenulate. Spur cylindrical or conical, shorter than the ovary. Grassy places. Woods, heaths, pastures. Perennial. June, July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1000 yards. T. 52°—37°.

A form of this plant was observed near Loch Katrine, with a single terminal flower. The entire spike was reduced to one floret. We proposed to call it *uniflora*. (See "Phytologist," N. S., vol. i., p. 452, 1856.)

9. ***O. latifolia***, Linn. Broad-leaved Meadow Orchis. E. B. 2308, L. C. 1052. Bulbs palmate. Stems erect, angular, stout, hollow, leafy almost to the top. Leaves lanceolate or oblong, large, sheathing, upper clasping. Bracts herbaceous, mostly longer than the flowers, lanceolate, tapering, three-nerved. Spike compact, ovate or oblong; flowers purple, more or less spotted; outer divisions of the perianth free, lanceolate, the two lateral ones more or less spreading. Lip large, three-lobed or only notched, the central lobe small, triangular, the two lateral ones slightly reflexed. Spur conical, cylindrical, shorter than the twisted ovary. Moist meadows. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

Var. *β. angustifolia* (*O. divaricata*, Rich). Leaves narrow, lanceolate or linear, erect.

SECT. II.—Pedicels of the pollen-masses united.

10. ***O. pyramidalis***, Linn. Pyramidal Orchis. E. B. 110, L. C. 1051. Bulbs entire, roundish. Stems ten-eighteen inches high, rather slender. Leaves linear-lanceolate, elongated, pointed. Bracts linear, pointed, three-nerved at the base, about as long as the ovary. Flowers in a very dense, short, ovate spike, of a beautiful rose colour. Outer divisions of the perianth erect, or slightly spreading. Lip three-cleft, segments about equal, oblong, obtuse, spreading; the two lateral ones larger than the central one, and slightly crenulate. Spur filiform, quite as long as the ovary. Grassy places; in a chalky or limestone soil. Perennial. June, July.

A. 13, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—48°.

11. ***O. hircina***, Linn. Lizard Orchis. E. B. 34, L. C. 1050. Bulbs entire, ovate. Stem robust, erect, leafy. Two-three feet high. Leaves oblong-lanceolate or ovate-lanceolate. Bracts linear, three-five nerved, longer than the ovary. Flowers in a long, cylindrical spike, greenish-white, with purple spots near the throat. Divisions of the perianth connivent, and forming a hood. Lip in three linear segments, the lateral shorter and narrower than the middle one, wavy, the middle one very long, twisted after flowering, with a truncate or two-three toothed extremity; spur short, conical. Kent; very rare; not uncommon in woods about Paris. Perennial. June.

A. 1, C. 1. Lat. 51°—52°. Alt. 0—50 yards. T. 49°.

VI. *Gymnadenia*, Rich. in part. Outer lateral divisions spreading; the upper one uniting with the two inner ones and forming a hood (casque); or all the divisions connivent. Inner divisions very narrow. Lip spreading horizontally or deflexed, three-lobed, or three-toothed, with a spur. Anther erect, with parallel, contiguous, or slightly distant lobes. Pollen-masses on free pedicels, not in a pouch. Ovary twisted.

1. ***G. conopsea*, Rich.** Fragrant-scented Orchis. E. B. 10, L. C. 1054. Bulbs palmate, twelve-eighteen inches high. Leaves lanceolate-linear, elongated. Bracts lanceolate, herbaceous, three-nerved, as long as the ovary, or longer than it. Flowers rosy-purple, sometimes white, in a dense, cylindrical, elongated spike; two lateral outer divisions of the perianth spreading; upper connivent with the two inner forming a hood. Lip three-lobed, obtuse. Spur filiform, pointed, curved, nearly or quite twice as long as the ovary. Odour of the flowers very agreeable. Chalky, grassy places. Perennial, June.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—700 yards. T. 52°—40°.

2. ***G. albida*, Rich.** White Fragrant-scented Orchis. E. B. 505, L. C., *Habenaria albida*, 1057. Roots consisting of several cylindrical or tapering entire knobs. Stem nine-fifteen inches high, leafy, hollow. Lower leaves oblong, rounded at the ends; upper ones lanceolate, pointed. Bracts herbaceous, about as long as the flowers. Flowers numerous, whitish or greenish, in a dense cylindrical spike, fragrant. Outer divisions of the perianth and the two inner ones converging, yellowish-white. Lip greener than the casque, three-lobed; the two lateral lobes pointed, the central ones sometimes blunt. Spur short, thick, shorter than the ovary. It has a sweeter smell than *G. conopsea*. Grassy, hilly pastures. About Callander, Perthshire; very common. Perennial. July.

A. 12, C. 30. Lat. 52°—61°. Alt. 0—650 yards. T. 47°—40°.

VII. *Habenaria*, Br. *Platanthera*, Rich. Outer divisions of the perianth connivent, or the two lateral spreading and the upper one connivent, with the two inner ones forming a hood. Lip linear, elongate, toothed, or entire with a spur. Anthers erect, more or less distant, parallel, or divergent at the base. Pollen-masses free, their pedicels not pouched. Ovary twisted.

SECT. I.—Spur very short, inflated.

1. ***H. viridis*, Br.** Frog Orchis. E. B. 94, L. C. 1056. Bulbs palmate, with fleshy fibres. Stems four-ten inches long, leafy at the base. Leaves ovate-elliptical, blunt, or pointed, clasping; upper ones lanceolate. Bracts herbaceous, lanceolate, three-nerved, longer than the flowers. Flowers yellowish-green, in a rather lax, oblong spike. Divisions of the perianth green, all connivent, and forming a hood. Lip long, linear, three-toothed, or cleft; the middle tooth, or lobe, shorter than the two lateral ones. Spur short, blunt, inflated (globular). Chalky pastures. Perennial. June.

A. 18, C. 70. Lat. 50°—61°. Alt. 0—850 yards. T. 50°—38°.

SECT II.—Spur long, slender, not inflated.

2. **H. chlorantha**, Bab. *Orchis bifolia*, Sm. Great Butterfly Orchis. E. B. 22, L. C. 1055 b. Bulbs entire, ovate-oblong. Stems angular, often nearly a yard high, robust, hollow. Lower leaves two, rarely three, oblong, or oblong-ovate, narrowed at the base, large; stem-leaves small, bract-like. Bracts herbaceous, with several nerves about equal to the ovary, or longer than it. Flowers greenish-white, in a long lax spike, odorous. Lip linear, elongate, entire. Spur filiform, curved, slightly inflated. Anther-lobes distant, diverging below. Moist woods. Perennial. May, June.

A. 17, C. 75. Lat. 50°—59°. Alt. 0—350 yards. T. 52°—43°.

Note.—The vertical range of this or the next may be extended. It was collected probably 1000 feet above Loch-na-gar and this lake is above 1000 feet higher than the level of Loch Tay. (See "Phytologist," N. S., vol. ii., p. 35.)

3. **H. bifolia**, R. Br. E. B. 2806, L. C. 1055. Stem much slenderer and scarcely half the height of *H. chlorantha*, with two elliptical radical leaves. Leaves all much smaller than in the above mentioned. Lower lip linear, about as long as the lateral lobes; upper lip triangular. Spur very long and slender. Anther truncate. Pollen-masses not converging as in *H. chlorantha*, more nearly parallel. Both abound in pastures near Callander, where they may be contrasted in a fresh state. Also in heathy parts of the south of England, as in Tilgate and St. Leonard's Forest, Sussex. Perennial. June, July.

A. 17, C. 75. Lat. 50°—59°. Alt. 0—350 yards. T. 52°—43°.

VIII. **Ophrys**, Linn. Bee Orchis, &c. Outer divisions of the perianth spreading; the two inner much smaller, erect. Lip thick, without a spur, spreading, or concave below, entire, or three-lobed, the mid-lobe entire, notched, or cleft. Anthers erect, the lobes not separated by a fleshy appendix. Pedicels of the pollen-masses in two distinct pouches. Staminodes very small. Ovary not twisted.

1. **O. muscifera**, Huds. Fly Orchis. E. B. 64, L. C. 1062. Bulbs entire, roundish. Stems slender about a foot high. Leaves oblong or oblong-lanceolate. Bracts herbaceous, usually longer than the ovary. Flowers few, distant, in a slender spike. Outer divisions of the perianth obtuse, herbaceous, spreading; *the two inner filiform, very slender*, blackish-purple. Lip velvety, dark-brownish purple, with a large bluish spot or patch, three-lobed; *the two lateral short and narrow*; the middle lobe more or less elongate and dilated, cleft. In chalky woods, pastures, and borders of fields. Perennial. May.

A. 10, C. 20. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—48°.

2. **O. apifera**, Huds. Bee Orchis. E. B. 383, L. C. 1060. Bulbs entire, ovate-roundish. Stems erect, eight-twelve inches high. Leaves ovate-oblong. Bracts herbaceous, about as long as the ovary. (Bracts longer than the germen (ovary), lanceolate, pointed, veined). Flowers few, distant, in a lax spike. Sepals lanceolate, pink, with a green herbaceous keel. Column terminating in a long hooked beak. Outer divi-

sions of the perianth ovate-oblong, rosy, with a green nerve; lateral pair of inner divisions linear, fleshy, erect, hairy, sometimes tipped with a colour like that of the lip. Lip velvety, centre lobe large, oblong, convex above, concave below, elongated, beautifully and regularly marked with broad yellow and brown lines, three-lobed; each of the three secondary lobes ending in *recurved, greenish, callous points*; two lateral primary lobes very hairy, triangular, occupying the base of the lip. Column green. Pollen-masses on long, filiform, pendulous pedicels. Ovary with six prominent ridges, curved and enlarged at the summit. Sometimes the flowers are white. In woods, banks, &c.; chiefly on a chalky soil. Perennial. June.

A. 10, C. 35. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—47°.

3. **O. arachnites**, Reich. Late Spider Orchis. E. B. 2596, L. C. 1060 b. Bulbs entire, roundish. Stems erect, eight-twelve inches high. Leaves ovate-oblong, or oblong; upper ones rudimentary. Bracts herbaceous, as long as the ovary. Flowers in a lax spike, not numerous. *Column terminating in a short straight (?) beak.* Outer divisions of the perianth ovate-oblong, rosy, with a green nerve; the two inner ones oblong-lanceolate, dilated at the base, *velvety*. Lip large, obovate, or roundish, dark purple, variegated with greenish, confluent lines, intermixed with brown lines; both kinds of lines symmetrical, undivided, with a glabrous, green appendage which is somewhat cordate, curved and prominent. Folkestone, Kent. Perennial. June.

A. 1, C. 2. Lat. 51°—52°. Alt. 0—100 yards. T. 51°—49°.

4. **O. aranifera**, Huds. Spider Orchis. E. B. 65, L. C. 1061. Bulbs entire, roundish. Stems rather shorter than either of the two preceding species. Leaves ovate-oblong or oblong; the lower ones usually more rounded at the apex than they are in *O. arachnites*. Bracts herbaceous, usually longer than the ovary. Flowers distant, in a lax spike, not numerous. Column ending in a short beak. Outer divisions of the perianth *ovate-oblong, pale green*; the inner ones *oblong-lanceolate*, of a deeper green. Lip velvety, oblong, or obovate, marked in the centre with two-four whitish or pale-green lines, symmetrically disposed, entire, or slightly notched, *without a terminal appendage*. Chalky places, in Kent and Sussex. Perennial. April, May.

β. *fucifera*. L. C. 1061 b. Drone Orchis. Inner divisions of the perianth roughish, dilated at the base. Lip with a wavy margin, when divided often with a gland in the notch. Folkestone, Kent. Rev. G. E. Smith.

A. 5, C. 10. Lat. 50°—54°. Alt. 0—100 yards. T. 51°—48°.

IX. Herminium, Br. Divisions of the perianth *convergent, forming a bell-shaped flower*; the inner divisions more fleshy than the outer, *toothed near the middle*. Lip *connivent with the other divisions*, three-lobed; lobes entire, linear, concave at the base, but not spurred, anther erect; lobes not separated by a fleshy appendage. Pollen-masses large, free, not in a pouch. Ovary twisted.

H. Monorchis, Br. Musk-scented Orchis. E. B. 71, L. C.

1059. Bulb entire, round, solitary during flowering, the other or recent bulb formed subsequently. Stem slender. Leaves ovate, or oblong-lanceolate. Bracts about as long as the ovary. Flowers small, yellowish-green, in a slender elongated spike, with a musky odour. In Surrey; in old chalk quarries about Dorking and Guildford. Perennial. June.

A. 5, C. 15. Lat. 50°—53°. Alt. 0—100 yards. T. 50°—48°.

X. **Aceras**, Br. Outer divisions longer and broader than the inner ones, all connivent, and forming a close, rounded hood. Lip long, narrow, pendent, in three linear divisions, the middle one the broadest, cleft. Anthers erect, lobes nearly contiguous, without a fleshy appendage. Pedicels of the pollen-masses in a common pouch.

A. anthropophora, Br. Green Man Orchis. E. B. 29, L. C. 1058. Bulbs ovate. Stem leafy, especially at the base. Leaves oblong or oblong-lanceolate. Bracts membranous, shorter than the ovary. Flowers in an elongated, rather lax spike, yellowish-green, with reddish nerves. Divisions of the perianth connivent; the outer much larger than the inner. Lip longer than the ovary, in three linear divisions; the lateral ones very narrow, the middle one broader and longer, cleft, each segment about as narrow as either of the two lateral divisions. Chalk quarries and dry chalky places. Perennial. May.

A. 3, C. 9. Lat. 51°—54°. Alt. 0—100 yards. T. 49°—48°.

TRIBE III.—**Neottieæ**. Root usually fibrous, rarely in fleshy masses (bulbs). Anther distinct from the column, often parallel to the stigma. Pollen-grains loosely coherent, almost powdery.

SYNOPSIS OF THE GENERA.

Neottia. Roots fibrous. Perianth hooded. Lip deflexed, cleft.

Spiranthes. Roots fleshy, rounded, or elongate. Perianth ringent. Lip entire.

Goodyera. Root creeping. Perianth ringent. Lip entire.

Listera. Root fibrous. Perianth ringent. Lip deflexed, two-lobed.

Epipactis. Roots fibrous. Divisions of perianth spreading. Base of the lip concave.

Cephalanthera. Perianth converging, except in *C. rubra*, where it is divergent. Lip nectariferous, or somewhat saccate at the base.

XI. **Neottia**, Rich. Outer and inner divisions of the perianth nearly uniform and equal, connivent. Lip elongated, cleft, concave at the base (much depressed), without a spur. Column elongated, notched. Anther terminal, ovate, with contiguous parallel lobes. Ovary not twisted.

N. nidus-avis, Rich. Bird's Nest. E. B. 48, L. C. 1036. Roots oblique, with numerous interlacing fibres, forming altogether a round mass of fleshy fibres. Stems erect, six-fifteen inches high, furnished with a few sheathing distant scales (abortive leaves), leafless. Bracts short, membranous. Flowers of the same colour as the rest

of the plant, pale yellowish-brown, in an oblong, more or less elongated compact spike. Column notched with two short beaks. Lobes of the lip divergent. In chalky or marly, very shady places. Perennial. June, July.

A. 16, C. 50. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—45°.

XII. *Spiranthes*, Rich. Lady's Tresses. Root turgid, fleshy, in two-three masses. Stems rigid, erect. Flowers in a more or less *twisted (spiral) spike*. Perianth tubular, two-lipped, forming an angle with the ovary. Lip contiguous to the divisions of the perianth and embraced by them, *entire*, concave, enclosing the column, without a spur. Column short. Anther terminal, pointed. Pollen-masses in a pouch. Ovary not twisted.

1. ***S. æstivalis*, Rich.** Early-flowering Lady's Tresses. E. B. 2817, L. C. 1034. Root fusiform, elongated. Stems erect, slender, leafy, nine-twelve inches high. Root-leaves *oblong-lanceolate*; stem-leaves *linear-lanceolate*, erect. Bracts longer than the ovary. Flowers small, white, in a one-sided spike. Lip ovate-oblong, rounded at the end. Bog between Lyndhurst and Christchurch, New Forest, Hants; Wyre Forest. Mr. Jordan. Perennial. July, August.

A. 1 (2), C. 1 (2). Lat. 50°—51° (53°). Alt. 0—50 yards. T. 51°—50°.

Note.—The long, slender, fusiform roots, the linear, elongate leaves, the smooth, slender, long stem distinguish this species from the following.

2. ***S. autumnalis*, Rich.** Late-flowering Lady's Tresses. E. B. 541, L. C. 1033. Root bulbous ovate-oblong. Stems six-nine inches high, rigid, *not leafy*, but with leaf-like adpressed bracts (abortive leaves), surrounded at the base by the remains of the decayed leaves of the previous year. Root-leaves *ovate, or ovate-oblong, in a kind of rosette, from the centre of which the stem of the succeeding year arises*. Bracts longer than the ovary. Flowers small, white, in a slender one-sided, spirally-twisted spike. Lip obovate, notched. Dry, chalky or gravelly pastures. Perennial. August, September.

A. 11, C. 40. Lat. 50°—55°. Alt. 0—100 yards. T. 52°—48°.

In this species the bulbs are variable, orbicular, ovate, and conical-elongated. Root-leaves ovate or lanceolate. Stem-leaves rudimentary. Stem and spike woolly. Lateral sepals lanceolate. Lip fringed. In moist pastures the root and root-leaves are elongated; in dry places both root and leaves are blunt and short. The lateral rosettes of leaves distinguish this from *S. æstivalis*.

3. ***S. cernua*, Rich.** *Neottia gemmipara*, Sm. E. B. 2786, L. C. 1035. Stem erect, two-three inches high, with two-three lanceolate, erect bracts. Root-leaves linear-lanceolate; stem-leaves triangular-lanceolate. Spike dense, flowers in three ranks. Sepals and petals, obtuse, equal; lip blunt. ("Linnæan Trans." xix., T. 32.) South of Ireland. Perennial. August, September. Hibernian (confined to Ireland, and not certainly known to exist there now.)

XIII. *Goodyera*, Br. Goodyera. Roots *widely creeping*,

woolly. Stems erect, leafy below, with several sheathing bracts above. Outer divisions of the perianth ovate, spreading, equal, connivent with the two inner divisions. Lip prominent, inflated, entire, supported by the two lateral outer divisions of the perianth. Column erect. Anthers parallel, free. Stigma prominent, pointed. Ovary elliptical, angular, furrowed. Seeds very minute.

G. repens, Br. Creeping Goodyera. E. B. 289, L. C. 1032. Root branched, creeping, more or less hairy. Stems leafy at the base, with sheathing bracts above, ten-fifteen inches high. Leaves ovate, petioled, scarcely pointed; bracts sheathing, pointed, hairy. Floral bracts rather longer than the ovary. Spike lax below, denser above, more or less hairy and glandular. Spiral. Flowers small, scented, downy on the outside. Lip white in the swollen part, with tawny stripes. Ovary brown, smooth. Scotland; in several places. Perennial. July.

A. 3, C. 9. Lat. 56° — 58° . Alt. 0—200 yards. T. 47° — 45° .

XIV. Listera, Br. Twayblade. Flowers *green*. Exterior divisions of the perianth connivent, with the two inner forming a hood, the latter slightly smaller or of the same size. Lip pendent or spreading, elongated, *two-cleft* or *three-four-cleft*, without a spur. Column short, or slightly elongated, terminated by the anther. Anther inclined, ovate, obtuse, with contiguous parallel lobes. Pollen-masses united. Ovary not twisted.

1. **L. ovata**, Br. Common Twayblade. E. B. 1548, L. C. 1038. Root of numerous, long, fleshy fibres. Stems slender, erect, naked, except where it has two opposite leaves, downy above. Leaves *ovate* or *roundish*, *large*, with curved, converging nerves. Flowers green, pedicelled on an elongated lax spike. Inner divisions of the perianth smaller than the outer, lip cleft, yellow-green, with two slightly prominent teeth at its base, one on each side. Column short, two-lipped, the upper one covering the anther; lip linear, two-cleft, with parallel lobes. Moist groves; shady places. Perennial. May, June.

A. 17, C. 75. Lat. 50° — 59° . Alt. 0—350 yards. T. 52° — 43° .

2. **L. cordata**, Br. Heart-leaved Twayblade. E. B. 358, L. C. 1037. Roots fibrous. Stems slender, erect, or slightly drooping or bending, angular, six-ten inches high. Leaves small, opposite, sessile, extending about half way up the stem, *cordate at the base*, *abruptly pointed*. Flowers small, in lax clusters, six-ten, usually green or slightly brown. Lip four-cleft, lateral lobes spreading, linear, narrow, medial lobes linear, broader than the lateral or basal ones. Column without any appendage behind the anther. Turfy, mountainous moors; north of England and Scotland. Perennial. July, August.

A. 14, C. 40. Lat. 51° — 60° . Alt. 0—200 yards. T. 48° — 39° .

XV. Epipactis, Rich. Helleborine. Roots fibrous, more or less fleshy. Stems rigid, tapering, erect, leafy. Divisions of the perianth connivent, or only slightly spreading, the inner ones usually as large as the outer. Lip *spreading*, *not spurred*, abruptly narrow in

the middle, partially three-lobed, the mid-lobe entire. Column short or elongated, bearing the anther at its summit. Pollen-masses in a common pouch. Ovary not twisted, attenuated at the base into a slightly-twisted pedicel.

1. *E. latifolia*, All. Broad-leaved Helleborine. E. B. 269, L. C. 1039. Stems erect, tapering leafy, eighteen-thirty inches high. Lower leaves *broadly ovate*, or *ovate-oblong*, pointed, strongly and prominently ribbed (nerved), sheathing and clasping; upper leaves lanceolate. Bracts herbaceous, the lower ones much longer, the upper much shorter than the flowers. Flowers in an elongated lax spike, rather pendulous. Lip *abruptly acuminate and curved, shorter than the lateral divisions of the perianth*, ovary *oblong or ovate-roundish*, deeply furrowed and downy. Woods, and fields in some places. Perennial. August, September.

A. 17, C. 60. Lat. 50°—59°. Alt. 0—200 yards. T. 51°—46°.

2. *E. ovalis*, Bab. Oval-leaved Helleborine. E. B. 2884, L. C. 1039 d. Stems angular, furrowed, purplish at the base, very leafy, one-two feet high. Leaves *ovate, acute*, upper lanceolate. Bracts equal to, or slightly shorter than the fruit. Pedicels very short. Fruit *obovate-roundish*, turgid, slightly downy, crowned with the withered flower. Rocky wood above the ebbing and flowing well, Giggleswick, Yorkshire. Perennial. July.

A. 17, C. 60. Lat. 50°—59°. Alt. 0—200 yards. T. 51°—46°.

In *E. ovalis*, Bab., the bracts are shorter than the flowers, and the leaves are clasping, but not sheathing, the ovary is more prominently rigid and smooth. (?)

3. *E. media*, (?) Fr. *E. purpurata*, Sm. Purple-leaved Helleborine. E. B. 2775, L. C. 1039 b. Stems slender, two-three feet high, leafy, scaly at the lower part (abortive leaves). Two lower leaves sheathing, ovate-lanceolate, the rest half-clasping and lanceolate, the upper leaves *linear-lanceolate*. Bracts about as long as the germen and flowers (slightly longer than the flowers under the lowermost, and slightly shorter than the flowers at or near the top of the spike). Sepals very pale green, lanceolate, spreading. Lip whitish, slightly tinged with pink, lobe triangular, slightly crenate, with a prominent pinky ridge extending from the throat to the point of the reflexed lobe.

Note.—The stem and leaves have a purplish tinge, and the spike is very lax, and not half the length of that in *E. ovalis*. In Uffmore Forest, near St. Kenelm's, Clent Hills, Worcestershire. Woods. Perennial. August, September.

A. 17, C. 60. Lat. 50°—59°. Alt. 0—200 yards. T. 51°—46°.

4. *E. palustris*, Sw. Marsh Helleborine. E. B. 270, L. C. 1040. Stems round, tapering, leafy. Leaves *lanceolate*, strongly nerved; lower leaves sheathing, upper ones clasping. Bracts rather longer than the pedicels. Flowers *drooping* in a lax cluster. Mid-lobe of the lip roundish, crenate. Fruit oblong or obovate, strongly-ribbed, slightly rough, crowned with the remains of the corolla. Marshy places; not common. Perennial. July, August.

A. 15, C. 50. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—46°.

XVI. Cephalanthera, Rich. Roots fibrous. Stems rigid, tapering. Divisions of the perianth mostly converging. Column elongated. Ovary *twisted*, sessile; in other respects it agrees with the preceding genus.

1. **C. grandiflora**, Bab. *C. pallens*, Richard and Koch. White Helleborine, E. B. 271, L. C. 1041. Stem ten-eighteen inches high, rigid, leafy, often with flexuous internodes, seldom straight. Leaves *ovate*, pointed, or *ovate-lanceolate*, half clasping, the lower ones reduced to sheaths. Bracts herbaceous or leaf-like, *surpassing or equaling the ovary*. Flowers large, white, erect in a lax spike, pedicelled. Divisions of the perianth blunt. Lip broad, ovate, or cordate, with several elevated lines. Ovary smooth, elongated. Woods, especially where the soil is chalky. Perennial. May, June.

A. 9, C. 25. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

2. **C. ensifolia**, Rich. Narrow-leaved White Helleborine. E. B. 494, L. C. 1042. Stems eight-fourteen inches high, slender, flexuous, erect, leafy. Leaves *linear-lanceolate*, *nearly equal*. Lower leaves elliptical-lanceolate, the lowermost clasping the stem, with very short sheaths. Upper leaves lanceolate, elongate, *grass-like*, in two rows. Flowers large, white, in a lax, often few-flowered short spike. Lower bract twice as long as the flower, *the other bracts minute, not half the length of the germen (ovary)*. Three outer sepals lanceolate-acuminate, much longer than the inner sepals, erect, or slightly spreading, inner sepals blunt, connivent. Lip dilated, erect, the throat furnished with five-six prominent ridges, and the base with two large erect lobes. Anthers cylindrical, pointed, divergent. In elevated woods; on a chalky or calcareous soil.

The plants from which the above description was drawn up were sent from Wyre Forest by Mr. Jordan.

A. 11, C. 20. Lat. 51°—57°. Alt. 0—200 yards. T. 50°—47°.

3. **C. rubra**, Sw. (Rich.) Purple Helleborine. E. B. 437, L. C. 1043. Leaves *narrowly lanceolate or linear-lanceolate*, *almost in two rows*. Bracts herbaceous, longer than the ovary. Lip *ovate-acuminate*. Ovary very downy. This rare species, which has not been recently gathered in England, is distinguished from *C. ensifolia* chiefly by its less pointed leaves, long bracts, and pointed white lip. Gloucestershire. Rev. Mr. Baker.

TRIBE V.—**Cypripediceæ**, Lind. Intermediate anther barren, lateral anthers perfect.

XVII. Cypripedium, Linn. Lady's Slipper. Roots creeping. Stem simple, erect, usually leafy. Leaves elliptical, ribbed, plaited. Flowers solitary and terminal. Outer sepals ovate-lanceolate, taper-pointed, coloured; inner sepals linear, lanceolate, pointed; lip obovate, inflated. Style short.

C. calceolus, Linn. Our Lady's Slipper. E. B. 1, L. C. 1065. Root tuberous, creeping. Stems solitary, solid, striated, downy, twelve-eighteen inches high. Leaves ovate, somewhat pointed,

clasping or sheathing at their base, three-four, alternate. Flowers terminal, usually solitary, sometimes two. Sepals ribbed, of a rich dark-brown colour, the two lowermost combined. Lip tumid, yellow, wrinkled, about an inch long, reticulated with veins and spotted internally. Woods, north of England, very rare. Haseltine Gill, not far from Settle. Also in woods near Ingleton, Arncliffe, &c.

Note.—This and *Orchis hircina* are the rarest of British orchids. A. 3, C. 3. Lat. 54°—55°. Alt. 100(?)—300 yards. T. 47°—46°.

ORDER XXIX.—AMARYLLIDACEÆ. THE NARCISSUS FAMILY.

Generally bulbous plants, with radical linear leaves, and usually spathaceous bracts. Flowers regular, with a six-parted perianth. Stamens six. Ovary three-celled, united with the tube of the perianth, with many ovules; sometimes one or two-seeded. Style single, with a three-lobed stigma. Fruit capsular. Seeds with a membranous episperm, or a brittle black, or a thick fleshy, testa. Albumen fleshy. Radicle directed towards the hilum. This order comprehends some of the most splendid ornamental plants, with symmetrical flowers. Most or all of them are possessed of poisonous qualities. They abound at the Cape of Good Hope, but some are found in Europe, Asia, America and Australia.

SYNOPSIS OF THE GENERA.

Galanthus. Stalk with a single flower, subtended by a leaf-like bract.

Leucojum. Flowers larger, usually more than one; pendulous.

Narcissus. Perianth crowned with a more or less developed cup.

I. *Galanthus*, Linn. Snowdrop. Bulb coated. Stalk radical, naked, bearing a single bracteated drooping flower. Leaves radical, in pairs. Perianth deeply six-parted, three outer segments spreading, three inner smaller, erect and notched or emarginate. Stamens six, with very short erect filaments, and terminal, acute anthers, with a bristly point inserted on the disk which covers the ovary. Ovary globose, with a cylindrical style and simple acute stigma, three-celled, and three-valved, each valve bearing a central partition. Seeds roundish, numerous, attached to the partitions. The snow-drop is readily known by its solitary, pendulous, early flower.

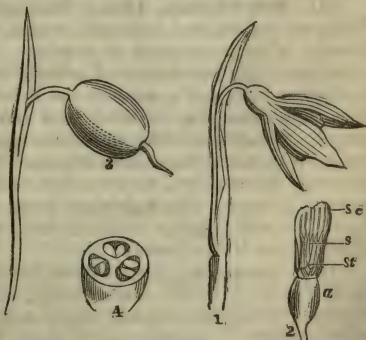


Fig. 129.—1. *Galanthus nivalis*. 2, α , ovary; st , stamens; s , style; sc , segment of the perianth; 3, fruit; 4, transverse section of ditto.

G. nivalis, Linn. Common Snowdrop. E. B. 19, L. C. 1074. (See Fig. 129, p. 325.) Leaves glaucous, linear, flat, two together enclosed in a long, membranous, entire sheath. Stem slender. Spathe linear, elongated. Outer divisions of the perianth ovate-oblong, the inner obovate or obcordate, with a green tip, and marked with greenish lines. Orchards, woods and shaws. Perennial. March. Alien (?). In woods about Stoke, next Guildford, and in meadows and shaws about Albury, near Guildford.

II. Leucojum, Linn. Snowflake. Bulb coated. Stalk radical, naked, with one or more drooping flowers. Leaves radical, linear. Perianth six-parted, not so deeply divided as *Galanthus*, with equal segments contracted at the summit, and somewhat thickened. Stamens six, with flattened filaments and slightly-spreading anthers. Ovary ovate. Style and stigma as in *Galanthus*. Capsule turbinate. Seeds several, globose. The flattened filaments, ovate fruit, and larger flower, which appears in summer, are almost the only differential characters of these two very closely-allied genera.

L. aestivum, Linn. Summer Snowflake. E. B. 621, L. C. 1075. Stalk compressed, two-edged or winged. Leaves very bluntly keeled below, hollowed above, blunt at the tips. Spathe lanceolate, ribbed, half herbaceous, about as long as the flowers. Flowers several (three-five) on separate pedicels, nodding. Sepals white, with greenish tips. Wet meadows, Thames side, opposite Blackwall; Kent. Perennial. June. It is to be feared that this locality has been altered so much that the plant can hardly be expected to appear on it any more. ^

A. 3, C. 6. Lat. 50°—53°. Alt. 0—50 yards. T. 51°—49°.

III. Narcissus, Linn. Narcissus, or Daffodil. Bulb coated. Stalk central (radical peduncle), naked, bearing one or more bracteated flowers, often compressed or angular. Leaves all radical, somewhat succulent, in two ranks. Perianth tubular, with a six-parted, flat, spreading limb, and a *more or less developed crown on the top of the tube*. Stamens six, inserted into the tube in two rows. Anthers linear. Ovary roundish, with three blunt angles, with a slender triangular style, and a three-cleft stigma. Fruit roundish, angular, membranous, three-celled, three-valved, with central partitions. Seeds several, globose. Distinguished from the other genera of this order by the mostly angular striated stem, and by the more or less developed crown of the blossom.

1. **N. poeticus**, Linn. True Narcissus (Narcissus of the poets). E. B. 275, L. C. 1071. Bulbs ovate, with dark brown coats. Stalk eighteen-twentyfour inches high, straight, two-edged, with rounded sides, hollow. Leaves nearly erect, broad, of a deep green, with sharp edges, and *rounded or convex beneath*; concave above, nerved, with reflexed margins about as long as the stalk. Bracts scarious, brown. Flowers usually single, pure white, large, beautiful, very fragrant, cup shallow, yellow, with a *beautiful crimson, crenate margin*.

Naturalized. (?) Shorne, between Gravesend and Rochester. Said to have been found in Norfolk. Perennial. May. Alien.

2. *N. biflorus*, Curt. Pale Narcissus. E. B. 276, L. C. 1072. Bulbs and stems similar to those of the preceding species. Leaves *with a more acute keel, and flat, not reflexed sides*, edges incurved. Flowers usually two, of a pale yellow colour. Cup *crisp*, waxy, yellow. Edge of the cup *white* and crenate. With the preceding, in Kent. Meadows near Totteridge, Herts. Common about Dublin. (?) Perennial. May. Alien.

Note.—The scape is slenderer and rather more compressed in *N. biflorus* than in *N. poeticus*. The leaves of both are strongly keeled, but in *N. poeticus* they are broader, and the margins are involute below and straight or revolute above, the edges are nearly uniform in *N. biflorus*.

N. lobularis, Haw. Segments of the perianth broadly ovate, and rather sharply acuminate (not tapering as in *N. pseudo-narcissus*). Cup (nectary, Linn.) divided into six lobes, and of the same colour as the segments of the perianth. From the Rev. W. T. Bree, Allersley Rectory, who cultivated it in his garden from roots found apparently wild near Tenby, Pembrokeshire, by the late Joseph Boulton, Esq. ("Bot. Gaz.," vol. iii., p. 83.)

3. *N. Pseudo-narcissus*, Linn. Daffodil. Lent Lily. E. B. 17, L. C. 1073. Leaves linear, blunt, striated, slightly furrowed and twisting. Stem compressed, with two prominent angles, bearing one flower. Tube of the corolla somewhat funnel-shaped and greenish where it unites with the ovary, with six more or less prominent angles. Segments of the limb ovate-acuminate, pointed. Crown tubular, campanulate, crenate or toothed, and slightly crisp at the margin, as long as the segments of the limb. In woods and meadows in the south of England; not very rare. Perennial. March.

A. 12, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

ORDER XXX.—IRIDACEÆ. Juss. THE IRIS FAMILY.

Terrestrial or aquatic herbs, usually with horizontal branching rhizomes, rarely bulbous-rooted. Leaves alternate, sheathing at the base, or all radical, sword-shaped, embracing each other, rarely linear. Flowers usually large, in a spike, cluster, corymb, or terminal panicle; rarely on a radical peduncle, or directly from the bulb. Perianth regular, tube united with the ovary; limb in six divisions in two rows. Stamens three, on the exterior divisions of the perianth. Anthers extrorse. Ovary united, with the tube of the perianth three-celled, with the ovules inserted at the inner angle. Style one. Stigmas often dilated and petal-like. Fruit capsular, three-celled, many-seeded, opening with three valves. Seeds with a membranous testa, rarely fleshy. Albumen thick, fleshy or horny. Radicle towards the hilum.

SYNOPSIS OF THE GENERA.

Crocus. Leaves grass-like; perianth funnel-shaped, with a long tube.

Iris. Leaves ensiform equitant; stigma petaloid.

Trichonema. Leaves filiform; perianth six-cleft, with spreading segments.

Sisyrinchium. Leaves grass-like; segments of the perianth spreading. Stigmas filiform.

Gladiolus. Root bulbous; stem leafy; leaves ensiform.

I. *Crocus*, Linn. *Crocus*. Bulb solid, externally coated. Leaves radical, keeled, revolute, with a white central stripe. Flowers growing directly from the bulb, solitary. Perianth tubular, with a



Fig. 130.—*Crocus sativus*. 1, Bulb, stem, and flower; 2, Calyx-tube cleft, showing the style and stamens; 3, A stigma magnified; 4, Capsule opening; 5, Section of seed.

funnel-shaped limb, in six divisions; three of the segments partly internal. Stamens three, in the mouth of the tube, with erect, arrow-shaped anthers. Ovary in the bulb, with a very long thread-shaped style, and a three-parted dilated and convoluted jagged or cleft stigma. Fruit capsular, membranous, three-celled, three-valved. Seeds several, globular. The grass-like striped leaves, the long, tubular flowers, with an upright funnel-shaped limb, and the inferior fruit distinguish this genus. None of the species are indigenous. At most they are but naturalized plants.

1. **C. vernus**, Willd. Spring Crocus. E. B. 344, L. C. 1069. Bulbs hairy (the fibrous parts of decayed leaves?). Stalk (peduncle) leafy, six-eight inches high. Leaves linear, erect, shorter than the flower, subsequently elongated. Flowers blue, throat of the corolla fringed with hairs, with erect ovate lobes and very long tube; stigma in three short, wedge-shaped, jagged lobes. Fruit capsular, ovate, elongated two-three inches above the bulb, enclosed in a spathe. Meadows near Nottingham, and Mendham, Suffolk. In a wood at Totteridge, Herts; plentiful. Perennial. March. Alien.

2. **C. nudiflorus**, Sm. Naked-flowering Crocus. E. B. 491, L. C. 1070. Bulbs with a membranous coat and some fibres. Stalks six-eight inches high, leafless, with membranous sheaths. Flowers solitary, fine deep purple. Tube of the corolla very long, segments of the limb large, ovate. Stigma in three deeply lacinated tufted segments. Fruit capsular, elliptical, stalked, ripening in the spring. Leaves pale, rather flat, narrower and less striped than the preceding, not appearing till about two-three months after the flower. Meadows, Nottingham. Perennial. October. Fruit in May following. Alien (?). Only doubtfully native.

3. **C. sativus**, Linn. Saffron. E. B. 343, L. C. p. 16. Bulb coated with a covering of anastomosing (interlacing) fibres. The leaves appear about the same time as the flowers, or just when the lower is decaying, they are narrowly linear, with inflexed borders. Flowers lilac mixed with violet. Stigmas odorous, orange-red. This plant was formerly cultivated near Saffron Walden, in Essex. It is said to be "not even naturalized." Perennial. September, October.

II. **Iris**, Linn. Iris, Fleur-de-lis. Herbs either with a root-stock or a bulb. Stem leafy at the base, rigid, erect, simple or branching. Leaves sheathing, usually ensiform, equitant at the base. Flowers spathaceous, terminal, clustered or solitary. Perianth regular, six-parted; three outer segments large and reflexed; three inner erect, narrow. Stamens three, on the larger segments, with oblong anthers, closely applied to the under surface of the stigmas. Ovary oblong, three-furrowed, with a short style. Stigmas three, dilated, petaloid, equal, opposite to, and above the three outer segments of the perianth. Capsule angular, three-celled, three-valved. Seeds numerous, globular, or compressed, in two ranks. The creeping tubers or usually fibrous roots, the round, rigid, erect stems, the sheathing, ensiform, usually equitant leaves, and the unequally divided perianth, together with the three broadly-dilated petal-like stigmas characterise this genus.

1. **I. Pseud-acorus**, Linn. Flag Water Iris. E. B. 578, L. C. 1067. Stems flat, with round, branching, stout, peduncles. Leaves lanceolate-linear, about as long as the stem. Bracts (spathes) herbaceous, acute. *Flowers large, yellow*, terminating the stem or branches. Outer divisions of the perianth *obovate, tapering below*, with brown veins, and two prominent teeth at the base; inner divisions small,

linear, shorter than the stigmas. Lobes of the stigma incised or toothed. In water and watery places. Perennial. June.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—150 yards. T. 52° — 45° .

The flowers are rarely observed to assume a coppery hue.

2. ***I. foetidissima***, Linn. Gladwyn Iris. E. B. 596, L. C. 1066. Stems rigid, erect, flattened, and slightly angular. Leaves mostly radical, leathery, rigid, linear-lanceolate, longer than the stem. Bracts herbaceous, leaf-like. Flowers bluish-white or lead-coloured, veined. Fruit ovate, turgid, with wider and deeper furrows than the preceding. Seeds large, round, not compressed, red. Woods and thickets. South and south-west of England. Ireland (?). Perennial. July.

A. 10, C. 30. Lat. 50° — 55° . Alt. 0—100 yards. T. 52° — 48° .

Note.—The flowers of this species are sometimes, but rarely, yellow. —Mr. J. Woods, in "Phytologist," vol. iii., p. 264.

I. tuberosa, Bab. E. B. 2818. Leaves tetragonal, segments of the perianth acute, root tuberous. Penzance; Cork.

III. ***Trichonema***, Ker. *Trichonema*. Bulb solid. Stem simple or branched, naked or one-leaved. Flowers solitary. Perianth funnel-shaped, with a short tube, and a regular and somewhat spreading six-parted limb. Stamens three, inserted in the mouth of the tube, minutely hairy, with oblong, converging anthers. Ovary roundish, with a longish style, and three stigmas, which are cleft to the base. Segments recurved, capsule roundish, with globose seeds. Seeds roundish.

T. columnæ, Rchb. *Trichonema*. Jersey Lily. E. B. 2549, L. C. 1068. Bulbs small, crowned with the remains of the decayed leaves. Stem four-six inches high, mostly solitary, one-flowered, filiform, leafy. Leaves compressed, twice as long as the stalk, filiform, furrowed, recurved. Bracts two, lanceolate, alternate, one herbaceous, the other scarious. Flower terminal, solitary, tubular, pale purple, yellow within. Outer sepals greenish-brown, inner ones bright blue. Stigmas cleft. Sandy places. Devon and Jersey. Perennial. April.

A. 1, C. 1. Lat. 50° — 51° . Alt. 0. T. 52° — 51° .

Grows wild, in great abundance, among turf, in a dry, sandy soil, on the Warren between Dawlish and Exmouth, Devonshire. The only British locality known.

IV. ***Sisyrinchium***, Linn. Roots fibrous. Stems erect, simple, leafy. Perianth six-cleft, with nearly equal spreading segments. Filaments united at their base. Stigmas three, filiform, involute.

S. anceps, Lam. L. C. 1067*. "Lodd. Bot. Cab." 1220. Root several thick fleshy fibres. Stems erect, about a foot high, slender, furrowed, more or less leafy. Leaves linear, grass-like, often longer than the stem. Flowers few, in lax clusters, rather longer than the spathe, on filiform pedicels, blue-veined, with long-pointed segments. Fruit capsular, obovate or roundish, tubercled or rough. In a wood near Woodford, Loughrea, Galway, Ireland. Mr. James Lynam. Hibernian.

V. *Gladiolus*, Linn. Corn-Flag. Roots bulbous. Stem leafy. Leaves sword-shaped, equitant. Flowers arranged in a lateral spike. Perianth funnel-shaped, two-lipped, with a short tube; stigmas dilated.

G. *communis* (?), Linn. *G. imbricatus* (?), Linn. Recently discovered in the New Forest, Hampshire. (See "Phytologist" for September, 1857.) As it is doubtful to which species of *Gladiolus* the assumed British plant belongs, its specific character is necessarily left undescribed. The following account of its locality is borrowed from the "Phytologist," as above quoted:—

"The *Gladiolus* grows in considerable numbers on both sides of the road from Bolderwood to Lyndhurst, about a mile from the latter place; also along a green path extending south-east from the turnpike on the road from Lyndhurst to Christchurch, two miles from the former, towards a new enclosure, near Rhinefield. Along this path it is met with at intervals of a quarter of a mile. It grows in dry situations among the brakes. These two stations are upwards of two miles apart, and both of them are a mile from any house."—(The Rev. W. H. Lucas, in a letter from Mr. Borrer.)

ORDER XXXI.—**DIOSCOREACEÆ**, Br. THE YAM FAMILY.

Herbaceous or shrubby, sometimes climbing, plants, with reticulated leaves. Flowers dioecious regular. Perianth adhering to the ovary, six-parted. Stamens six. Ovary three-celled, with one- or two-seeded cells. Style trifid. Fruit a berry. Seeds round. Albumen fleshy. Embryo very small, near the hilum. This plant, the sole British representative of the order, is easily known by its climbing habit, bright, shining, reniform or cordate leaves, and by its red fruit. The yam, an important article of diet in tropical countries, is the only remarkable plant in the order. The species are mostly confined to warm regions; only a few inhabit temperate countries.

Tamus, Linn. Lady's Seal. Perianth bell-shaped, limb six-parted; six stamens; perianth of the female flower adhering to the ovary, with six abortive stamens. Ovary three-celled, two-seeded. Fruit a berry.

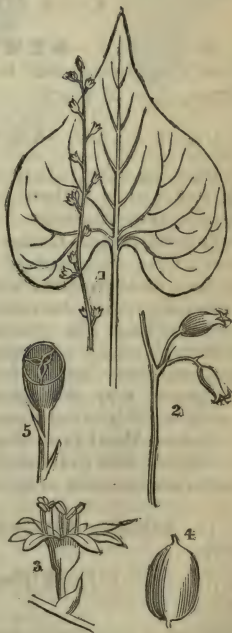


Fig. 131.—1, *Tamus communis*, diminished; 2, female flower; 3, male flower magnified; 4, fruit natural size; 5, transverse section of fruit.

T. communis, Linn. Common Lady's Seal. Black Briony. E. B. 91, L. C. 1104. Stems slender, round, leafy, climbing, twining, very long. Leaves on long petioles, deeply cordate, sometimes with elongated lobes, tapering, shining, petiole furnished with two glands at the base. Flowers whitish-yellow, or green, in slender, lax, axillary clusters. Divisions of the perianth lanceolate, of a greenish colour. Berries red, rather smaller than a currant. Woods, shady places, hedges. Perennial. June.

A. 12, C. 50. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—47°.

CLASS III.—DICOTYLEDONS.

SUB-CLASS I.—**GYMNOGENS**. Ovules naked, *i.e.*, pollen directly communicated to the ovules without the intervention of stigma, style, or ovary.

ORDER XXXII.—**CONIFERÆ**. THE PINE FAMILY.

Stem ligneous. Leaves entire, linear, rigid or acerose, sometimes fascicled with a scaly sheath. Inflorescence spicate. Male flowers monœcious or diœcious. Spike deciduous. Fertile flowers in cones; ovary a flat scale. Ovules in pairs, naked on the face of the ovary. Fruit a cone composed of the scale-shaped, enlarged and indurated ovaries. Seed invested with a crustaceous perisperm. Forest trees or shrubs, abounding in resinous products, as turpentine, balsams, &c., and furnishing the greatest abundance of the most useful timber, almost universally employed for building and other domestic purposes. They are easily known from all other trees by their narrow, often ever-green, very sharp-pointed leaves, and by their fruit, which is usually what is called a cone. (See p. 137, and Fig. 132, p. 333.)

Note.—About three-fourths of the order are natives of the northern hemisphere, and the remaining fourth belongs to the southern. Some species are common to both.

The following Sub-Orders comprehend all the British genera and species:—

SUB-ORDER I.—**Abietinæ**. THE FIR, PINE, SPRUCE, AND LARCH TRIBE.

Fruit in cones, with one or two ovules at the base of each scale of the cone. (See Fig. 132, 1.)

SUB-ORDER II.—**Cupressinæ**. THE CYPRESS TRIBE.

Fruit an indurated cone, or globular, fleshy process called a *galbulus*, with connected scales.

SUB-ORDER III.—**Taxinæ**. THE YEW TRIBE.

Fruit a kind of drupe, with a solitary ovule in its centre.

SUB-ORDER I.—ABIETINÆÆ.

Pinus, Linn. Fir. Resinous, large trees, with narrow, linear, mostly evergreen leaves. Flowers monœcious, barren flowers in ovate-oblong catkins, fertile ones in cones. Stamens naked, spreading, with short filaments and erect, wedge-shaped anthers. Female flowers in ovate cones, composed of imbricated scales, thickened and angular at the end. Ovaries two, at the base of each scale. Seed crustaceous and winged, germinating with many cotyledons. This genus may be distinguished by the fasciated leaves (two or more of which being enclosed at their base by a scarious sheath),

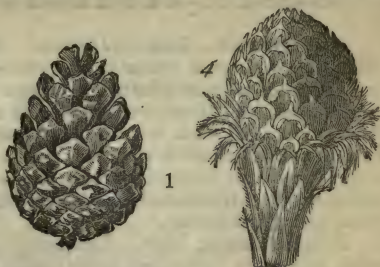


Fig. 132.—*Pinus sylvestris*. 1, mature cone; 4, female flowers.

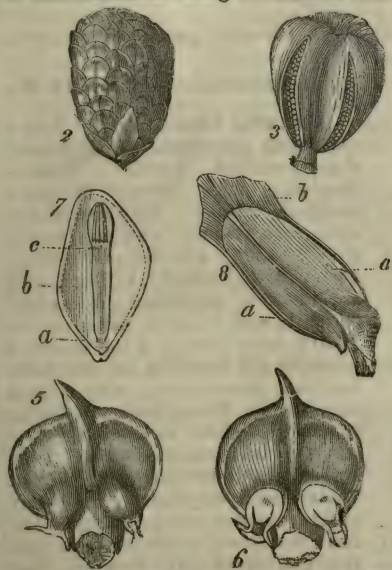


Fig. 132.—*Pinus sylvestris*. 2, male flowers; 3, a single stamen; 5, a scale of the female flower, with the two inverted ovules; 6, a section of 5, showing the ovary; 8, a portion of scale of ripe cone, showing the seed *a*; 7, a section of the seed, showing the cleft cotyledons.

and by the scales of the cone (strobilus, see Fig. 132) being enlarged (thickened), and angular at the apex.

P. sylvestris, Linn. Scotch Pine or Fir. E. B. 2460, L. C. 1029. Lofty trees with verticilled (whorled) branches. Leaves in pairs, in a membranous sheath, rigid, grooved below, convex above, acerose. Cones (fruit) in pairs, at first erect, afterwards inclined downwards, on a bent peduncle, ovate or ovate-conical. Wing about three times as long as the seed. Tree. May, June.

A. 3, C. 8. Lat. 56°—59°. (Surrey, Hants?) Alt. 0—700 yards. T. 47°—40°.

Var. *β*. *P. rubra*, Mill. Scottish Pine. Cones much shorter than in the type.

Spontaneous in Scotland, and in some localities in England, in the

vicinity of plantations. It is the chief tree in the mountainous forests of the north of Europe.

SUB-ORDER II.—CUPRESSINEÆ.

Juniperus, Linn. Juniper. Evergreen aromatic shrubs, with narrow leaves, either sharp-pointed and spreading, or obtuse, minute and closely imbricated. Flowers diœcious, male flowers small, in ovate catkins; female ones in a small axillary cone. Scales of male flowers whorled, each bearing from four to seven anthers. Female flowers bearing three ovules, in a three-cleft, fleshy involucre, which is formed of the three uppermost scales of the cone. Fruit round, fleshy, succulent, coloured, berry-like, formed of the cohering scales. Seed nearly triangular.

J. communis, Linn. Juniper. E. B. 1100, L. C. 1030. Shrub with numerous spreading branches. Leaves glaucous, spreading, *linear-subulate*, sharply pointed, and *pungent*. Fruit (cones) green, then black, with a glaucous bloom when ripe. In elevated open places. Shrub. Flowers April and May; bears fruit in August and to October.

A. 18, C. 70. Lat. 50°—61°. Alt. 100—900 yards. T. 49°—46°.

SUB-ORDER III.—TAXINEÆ.

Taxus, Linn. Yew. Large trees, with evergreen, mostly linear, slightly-stalked leaves. Flowers diœcious; male flowers in small roundish catkins. Stamens numerous, with rounded anthers, which, after bursting, are flat and peltate. Fertile flowers solitary, axillary, with an inferior, succulent, permanent perianth, and a single naked ovule. Fruit a berry formed of the enlarged perianth, not investing all the seed. Seed one, ovate-oblong, with a hard bony testa. These trees are distinguished by their very thick short stems, much branched tops, leafy branches, and by their pulpy fruit. Their wood is very durable, and many of these trees are of great age. The fruit is *vulgarly* esteemed poisonous, and the leaves are *certainly* very dangerous.

T. baccata, Linn. Common Yew. E. B. 746, L. C. 1031. Stem very much branched; branches usually contiguous. Leaves linear-pointed, often with revolute margins,



Fig 133.—*Taxus baccata*. 1, Male flowers. 2, Female flowers; 3, ditto magnified; 4, section of the ovary; 5, fruit; 6, section of the seed.

seen 30 years in Wickbury but our Hayley
Des says enormous at Cradley Hereford sh have

on short petioles, contiguous, almost in two rows. Fruit succulent, of a beautiful red colour, and sweetish taste. Seed brownish, shining. Apparently spontaneous on the Northern Downs. Often cultivated as an ornamental tree; also for hedges. Flowers, April. Fruit, September.

A. 14, C. 40. Lat. 50°—58°. Alt. 0—200 yards. T. 49°—46°.

This tree appears to be indigenous on Merrow Downs, near Guildford, Surrey. Here the trees are evidently very ancient. It is more plentiful on Sanderstead and Riddle Downs, near Croydon, where many of the trees are only as large as bushes.

SUB-CLASS II.—EXOGENS. GROUP I.—*Achlamydææ*.

DIVISION I.—Perianth single, herbaceous, or none.

SUB-DIVISION I.—*Amentiferæ*. (See p. 137.)

AMENTIFERÆ. THE CATKIN-BEARING FAMILIES.

Stem ligneous. Leaves more or less expanded, not linear, acicular and acerose, as in *Coniferæ*, alternate, usually stipulate. Flowers in catkins, unisexual. Male flowers in catkins or capitate, sometimes with a membranous perianth. Female flowers clustered, solitary, or in catkins. Stamens variable, distinct or cohering, from one to twenty. Ovary simple, with one or more stigmas. Fruit membranous or bony, or drupaceous, indehiscent or dehiscent.

The Willows (*Salicaceæ*) have two-celled, two-valved, many-seeded fruit. *Corylaceæ* are distinguished by their parallel-nerved leaves, and by their fruit (a nut) inclosed in an indurated cup or involucre. The two-celled fruit of *Betulaceæ* is not enclosed in a cup. The order *Myricaceæ* is generally distinct from the above orders by its resinous nature, and by its fleshy fruit.

ORDER XXXIII.—SALICACEÆ.

Trees or shrubs with alternate simple leaves, and persistent or deciduous stipules. Inflorescence amentaceous. Ovary superior, one- or two-celled, with numerous ovules. Fruit coriaceous, one- or two-celled, two-valved, many-seeded. Seeds either adhering to the base of the cells, or to the lower part of the axis of the valves, covered with long silky hairs (comose). These plants are known by their rapid growth, by their usually narrow leaves, and especially by the nervation of the leaf, which does not extend from the midrib to the margin, and by the comose seeds. Their bark is astringent. They have a greater range than *Betulaceæ*, reaching further north. The most northern woody plant known is a willow, *Salix arctica*.

SYNOPSIS OF THE GENERA.

Salix. Leaves usually narrow; scales of catkin entire; stamens two-three, rarely five.

Populus. Leaves dilated; scales of catkin torn or laciniated; stamens eight-twelve or more.

Salix, Linn. Willow. Sallow. Osier. Trees or shrubs with round, flexible branches, and with simple, entire, stipulate leaves. Inflorescence dioecious, both male and female florets in long cylindrical



Fig. 134.—*Salix herbacea*. 1, catkin; 2, a single male floret; 3, a single female floret; 4, fruit; h, the barren shoots.

cal catkins. Scales of both kinds of florets, oblong, each bearing a single floret. Stamens two, rarely one, or from three to five or more, with two-lobed, two-four-celled anthers. Ovary ovate, sessile, or stipitate, with a persistent style, and two spreading stigmas. Fruit capsular (follicular), one-celled, two-valved. Seeds numerous, crowned with soft, upright hairs. The rapid growth, tough, flexible, slender branches, slender catkins, and especially the smaller number of stamens will be sufficient to distinguish this genus from the Poplars.

Note.—It has been found, on trial, impracticable to select discriminative specific characters for the members of this family of plants. The attempt to distinguish these in the sections is far from being successful.

SYNOPSIS OF THE GENUS.

SECT. I.—**Fragiles**. Trees; branches easily broken from the trunk, especially at the period of floration (flowering). Leaves lanceolate or elliptic, acuminate, acute, serrate, smooth or with silky appressed hairs.

Scales of the catkin caducous (sooner or later, but always before the fruit ripens), lateral, the fertile ones pedunculate (on a lateral leafy young branch). Nectary (glands) double before and behind. Stamens two-ten, slightly coherent at the base, and rough. Fruit *pedicelled* or *sessile*.

Species.—*S. pentandra*, *cuspidata*, *fragilis*, *alba*.

SECT. II.—**Amygdalineæ.** Shrubs or trees with wand-like branches. Leaves lanceolate or oblong-lanceolate, acuminate, hairy, or silky when young. Smooth when fully grown. Scales of catkins persistent. Glands double. Stamens two-three, cohering a little at the base, rough. Fruit *pedicelled*.

S. amygdalina, *triandra*.

SECT. III.—**Purpureæ.** Trees or shrubs. Leaves linear-lanceolate, or obovate-lanceolate, slightly serrated, smooth, or with adpressed silky hairs. Catkins lateral, sessile, subtended by small scale-like leaflets (bracts). Fertile catkins on short peduncles (*nearly sessile*). Fruit sessile, or nearly so.

S. purpurea, *Helix*, *rubra*, *Forbyana*.

SECT. IV.—**Viminales.** Shrubs or trees, with slender, wand-like branches. Leaves elongate, *quite entire*, or minutely denticulate, cottony (tomentose) on the under side. Catkins nearly sessile, *appearing with, or before the leaves*, subtended by small leaf-like bracts, fertile catkins, sometimes on short peduncles, which are slightly leafy (bracts become small leaves). Scales discoloured at the tips. Stamens *free*, rarely coherent.

S. viminalis, *stipularis*, *Smithiana*, *acuminata*.

SECT. V.—**Caprææ.** Trees and shrubs. Catkins lateral, the male ones sessile, subtended by small leaves, female (fertile) ones more or less pedunculate, peduncle clothed with enlarged leaves. Scales discoloured at the tips; anthers yellow when empty. Fruit on *pedicels twice as long as the glands*.

S. cinerea, *aurita*, *ambigua*, *caprea*, *nigricans*, *bicolor*, *hastata*, *lanata*, *repens*, *angustifolia*, *rosmarinifolia*, *doniana*.

SECT. VI.—**Frigidæ.** Much branched shrubs. Catkins lateral, and the fertile ones more or less stalked on a leafy peduncle (in *S. Lapponum* often sessile), scales discoloured at the tips; anthers yellow or tawny when empty. Fruit *sessile, or on short pedicels*.

S. arbuscula, *Lapponum*, *myrsinites*, *procumbens*.

SECT. VII.—**Glaciales.** Dwarf shrubs, often with creeping underground stems and ascending branches. Catkins *terminal on a leafy peduncle* (the terminal shoot).

S. reticulata, *herbacea*.

SECT. I.—**Fragiles.** Catkins (flowers or fruit) *on lateral leafy peduncles*. Scales of fertile catkin deciduous (falling off before the fruit ripens). Stamens two-three-five, or more.

1. ***S. pentandra***, Linn. Sweet Bay-leaved Willow. E. B. 1805, L. C. 999. A large shrub or small tree, with bright, glossy foliage. Leaves oblong-ovate, or elliptical-lanceolate, with a more or less abrupt or shortly tapering point, finely serrated or crenated, smooth

S. pentandra pools near the N or center sh. Lees

above, sometimes slightly downy below, petioled. Male flowers in large yellow catkins (spikes), with hairy scales, and from five to ten stamens, which are more or less hairy at the base. Fruit smooth, on very short pedicels, in long, cylindrical-ovate, dense catkins, with a long, tapering point. Woods. Strathmartin, Forfarshire, and Gilling, Yorkshire. Tree. June, July. Leefe's Willows, 1, 2.

A. 14, C. 40. Lat. 51° — 58° . Alt. 0—200 yards. T. 49° — 46° .

2. *S. cuspidata*, Schultz, *S. meyeriana*, Willd. Loudon's "Arboretum," 1504 and 1610, L. C. 1000. (See Leighton's "Shropshire Flora.") Tree, twenty-thirty feet high. Leaves oblong-lanceolate, acuminate, serrated and glandular. Stipules half heart-shaped, oblique at the base. Catkins cylindrical, on leafy stalks. Stamens three-four, with filaments more than double the length of the scale. Fruit ovate, slender, glabrous, stalked. Style short. Stigma notched. Catkins in April. Alien.

3. *S. fragilis*, Linn. Crack Willow. E. B. 1807, L. C. 1001. A tall tree or shrub. Branches rather erect, brittle at the base (young branches in spring easily separating from the trunk). Leaves lanceolate, acuminate, finely-toothed, shining above, slightly hairy below, petioled, with ovate, curved, usually caducous stipules. Catkins appearing with the leaves. Stamens two-five, not much longer than the hairy scales. Fruit on very short pedicels, ovate, lanceolate, tapering, smooth. About the sides of rivers, and other low marshy places. Tree or shrub. April, May.

A. 16, C. 70. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

Var. *S. Russelliana*, Sm. E. B. 1808. Leaves narrower, glaucous beneath, tapering at both ends, rather coarsely serrated. Stigmas longer than the styles. The wood and bark of this variety are esteemed as very valuable.

Var. *S. decipiens*, Hoff. Varnished Willow. E. B. 1937, L. C. 1001 a. Tree, with shining polished bark. Leaves lanceolate, tapering at each end, one side more curved than the other, rather thicker and more leathery than the former. Barren catkins small, more or less leafy, on short peduncles, dense, one-two inches long. Fertile catkins rather longer. Fruit lanceolate, on short pedicels, tapering into a stout style. Meadows, hedges, and osier-grounds. Tree. May. Catkins, May 5th. Leaves, August 14th. Audley End, Essex. Leefe, 50.

Range of both these varieties the same as that of the type.

4. *S. alba*, Linn. Common White Willow. E. B. 2430, L. C. 1002. Tall tree, with deeply-fissured bark. Branches numerous, spreading. Leaves lanceolate, tapering at both ends, serrated, whitish, silky on both sides, especially on the under side, floral leaves fringed. Catkins slender, cylindrical. Fruit nearly sessile, small, ovate, with a short thick style and two-lobed stigma. In woods, meadows, and pastures. Tree. May, and often again in July. Catkins, May 16. Leaves, September 4. Gilling, Richmond, Yorkshire. Ward, 59.

Var. *a. cærulea*. E. B. 2431. Leaves glaucous and smooth beneath. Leefe, 57.

Var. *β. vitillina*. E. B. 1389, L. C. 1002*. Bark of the young branches shining yellow or red.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

SECT. II.—*Amygdalineæ*. (See p. 337.)

5. *S. triandra*, Linn. Long-Leaved Willow. E. B. 1435, L. C. 1004. Branches erect, tough, leafy, brownish-red or olive. Leaves oblong-lanceolate, or oblong-tapering, pointed, rounded at the base, petioled, toothed, shining above, smooth and glaucous below, with prominent nerves, teeth erect. Stipules with one basal, round lobe, crenate-toothed, very variable. Male catkins numerous, appearing with the leaves, long, cylindrical, on short, leafy peduncles. Stamens three, much longer than the smooth scales. Fruit smooth, ovate, compressed, with a very short style, and cleft spreading stigmas. In woods, hedges, and osier-grounds. Tree. May—August.

Var. *β. S. triandra*, Curtis. Leaves oblong-lanceolate, narrower and longer than in the type, paler and glaucous beneath.

Var. *γ. S. Hoffmanniana*, Sm. E. B. 2620. Leaves ovate-lanceolate, acuminate, sharply serrate; stipules large, ovate, or half-cordate. Catkins, May 4. Leaves, August 12. Leefe, 5.

A. 12, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

5*. *S. acutifolia*, Willd. Acute-leaved Willow. Branches dark red, with a dense cæsius (lavender-coloured) bloom. Leaves linear-lanceolate, elongate, pointed. Catkins sessile. Fruit ovate-conical, glabrous, sessile, with long styles. Cleveland, Yorkshire. March. Have fertile plants been seen in England?

6. *S. amygdalina*, Sm. Almond-leaved Willow. E. B. 1636, L. C. 1004*. Small tree or shrub, with round, furrowed, spreading, leafy branches. Leaves oblong-ovate (elliptic-lanceolate), rather acuminate, sharply and equally toothed, glabrous, on short stalks. Stipules cordate or reniform, crenate, variable in size. Barren catkins cylindrical, scales yellow, slightly hairy. Stamens, three or more. Fruit nearly sessile, ovate, tumid, tipped with the nearly sessile stigmas, glabrous, furrowed. Down of the seeds shorter than in *S. triandra*. Audley End, Essex. Catkins, May 9. Leaves, July 4. Leefe, Ward, 3, 4.

A. 12, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

7. *S. undulata*, Ehrh. *S. lanceolata*, Sm. Sharp-leaved Triandrous Willow. E. B. 1436, L. C. 1003. Tree not quite so tall as the preceding triandrous forms. Leaves longer and narrower than in *S. triandra*, lanceolate, tapering at both ends, sharply serrated, often wavy (undulate). Stipules pointed. Catkins like those of *S. triandra*. Fruit ovate, constricted near the middle, smooth, stalked. Style and stigmas elongate, the latter cleft. Audley End, Essex. Leefe, 9. Tree. Catkins, April 25. Leaves, August 12.

A. 6, C. 8. Lat. 50°—57°. Alt. 0—100 yards. T. 50°—47°.

SECT. III.—*Purpureæ*. Catkins lateral, sessile, or on very short peduncles.

8. *S. purpurea*, Linn. Bitter Purple Willow. E. B. 1388, L. C. 1005. Shrub, with long, slender, smooth, purple, shining branches. Leaves somewhat oblique, lanceolate, broader above, and toothed, narrowed, nearly entire below, rather abruptly acuminate, smooth, glaucous or grey below. Catkins slender, cylindrical, compact, appearing before the leaves. Stamens two, with their filaments united, so as that the stamens appear *one with a four-cleft anther*. Fruit sessile, broadly elliptical, densely covered with silky hairs. On river banks, &c. Tree. March, April.

A. 14, C. 50. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

Var. *α*. *S. Helix*, Linn, and *S. ramulosa*, Borr. Rose Willow. E. B. 1343. L. C. 1005*. Branches (shoots) slender, polished, tinged with red or purple. Leaves elongated and narrower than in the type, linear, oblique. Marshes, osier-holts, &c. Tree or shrub. March, April. Richmond, Yorkshire. Catkins, April 22. Leaves, July 9 (?). Ward, 11.

Var. *γ*. *Woolgariana*, Borr. E. B. 2651. Leaves broad towards the top, cuneate below, glaucous underneath. Fertile catkins thicker and softer (with longer down).

Var. *δ*. *S. ramulosa*, Borr. Leaves oblong-lanceolate, more or less oblique (unequally-sided), narrowed at the base, more or less acuminate, pale beneath.

Var. *ε*. *S. Lambertiana*, Sm. E. B. 1359. Leaves oblong or linear-lanceolate, faintly serrated towards the point, slightly attenuated towards the base, with slightly oblique sides. A broad-leaved form of *S. purpurea*, And. Richmond, Yorkshire. Leaves, July 9.

9. *S. rubra*, Huds. Green-leaved Osier. E. B. 1145, L. C. 1006. Branches olive or greenish-yellow, rarely yellow. Leaves lanceolate or linear-lanceolate, elongate, rather broader upwards, acuminate or shortly pointed, slightly serrated above, entire, or almost entire below, edges somewhat revolute and pubescent below. Stipules linear, toothed, stalked, small or wanting. Catkins leafy at the base, nearly sessile, appearing with the leaves. Scales covered with long silky down. Stamens two, united about *half-way from the base, appearing like a cleft filament*. Fruit downy, sessile. Meadows, osier-holts. Tree or shrub. Richmond, Yorkshire. Catkins, May 11. Leaves, July 14. Ward, 15. Audley End, Essex. Catkins, April 6. Leaves, July 17. Leefe, 16. The latter plant, No. 16, is without stipules.

A. 12, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

Var. *S. Forbyana*. E. B. 1344, L. C. 1006*. Leaves broader, lanceolate-oblong, deep green above, glaucous underneath, serrate or crenate. Fertile catkins like those of *S. Helix*. Meadows and osier-holts, East of England. Shrub. April.

SECT. IV.—*Viminales*. (See p. 337.)

10. *S. viminalis*, Linn. Common Osier. E. B. 1898, L. C. 1007. Tree with erect, slender, flexible, polished, grey or green branches. Leaves lanceolate-elongate, linear-lanceolate or acuminate, entire revolute, green above, white and silky beneath. Stipules (if

present) lanceolate-linear, small. Barren catkins numerous, sessile, with small leaves or bracts at their base, appearing before the leaves; fertile catkins smaller, appearing with the leaves. Stamens two. Fruit ovate, sessile, silky. *Style long; stigmas filiform.* Wet meadows, osier-holts, river banks. Tree. Richmond, Yorkshire. April 16. Leaves, July 16. Ward, 20.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

Var. *β. intricata*, Leefe. Leaves broader. Fruit and style shorter. Stigmas reflexed and entangled.

Var. *γ. stipularis*, Leefe. Stipules present, curved, linear-lanceolate or semi-cordate. Leaves lanceolate, slightly-toothed, acuminate. Stigmas very long, divided. Audley End. Catkins, April 5. Leaves, July 10. Leefe, 22.

11. *S. stipularis*, Sm. Auricled Osier. E. B. 1214, L. C. 1007*. Shrub, ten-twenty feet, with erect, downy, reddish, brittle twigs. Leaves elongate, lanceolate, obsoletely crenate, white and downy beneath. Catkins appearing before the leaves, numerous, sessile, erect, fertile twice as large as the barren ones. Fruit ovate, downy, nearly sessile. Style short. Stigmas long, linear, undivided. Wet places.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

S. ambigua major (?). (See under *S. repens*, p. 347.)

12. *S. Smithiana*, Willd. Silky-leaved Osier. E. B. 1509, L. C. 1008. Branches (shoots) slender, downy, leafy. Leaves lanceolate-elongate, tapering at both ends, slightly undulate and crenate, nearly smooth above, densely silky or downy below, midrib reddish. Stipules toothed, hairy, crescent-shaped. Catkins numerous, nearly sessile, appearing before the leaves, subtended by a few silky bracts or leaflets. Fruit stalked, tapering, closely invested with long silky hairs. Style long. Stigmas deeply cleft, with linear segments. In wet places. Shrub. April, May.

A. 16, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

Var. *α. S. Smithiana*. E. B. 1509. Stipules minute, lanceolate.

Var. *β. S. rugosa*, Sm. Leaves oblong-lanceolate, sharply-pointed, undulate and crenate, broader than in the other forms. Audley End, and Richmond. Catkins, March 19, April 7. Leaves, July. Ward, Leefe, 31, 32.

Var. *γ. S. ferruginea*, And. E. B. 2665. Leaves narrowly oblong or oblong-lanceolate, tapering at the base. Stipules toothed, broadly cordate.

13. *S. acuminata*, Sm. Long-leaved Sallow. E. B. 1434, L. C. 1009. Tree, with erect or slightly-spreading branches, with soft, downy, young shoots. Leaves lanceolate, oblong, or elliptical, downy and cinereous beneath, usually smooth above, with reddish downy ribs and petioles. Stipules large, half ovate or cordate, acute, toothed. Catkins cylindrical, with ovate bracts. Fruit ovate, tapering, densely hairy or silky. Style about as long as the undivided stigmas. Audley End. Leaves, August 18. Leefe, 37.

A. 14, C. 40. Lat. 50°—56° (60°). Alt. 0—200 yards. T. 51°—47°.

14. *S. cinerea*, Linn. Grey Sallow. E. B. 1897, L. C. 1010.

more
spike
Ward

Tree, often very dwarf and bushy, with leafy, downy, more or less rusty shoots. Leaves oblong or obovate, ashy (cinereous), glaucous, pubescent or slightly cottony (tomentose) beneath. Barren catkins sessile, appearing before the leaves, ovate-oblong; fertile catkins oblong-cylindrical. Filaments hairy at the base. Fruit ovate-lanceolate, subulate, silky, on a silky stalk. Style very short. In moist woods and hedges. Tree. March, April.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—42°.

Var. *a.* *S. cinerea*, Sm. E. B. 1897. Leaves obovate-lanceolate, thick, reddish beneath. Stipules half cordate. Style very short.

Var. *β.* *S. aquatica*, Sm. E. B. 1437. Leaves obovate-elliptical, whitish-glaucous below, crenate, serrated; teeth various. Fruit densely hairy, in compact catkins. Richmond. Catkins, April 9. Leaves, July 4. Ward, 38.

Var. *γ.* *S. oleifolia*, Sm. (?) E. B. 1402. A form of *S. cinerea*.—And. in "Bot. Gaz." Leaves obovate-lanceolate, green beneath. Catkins very large, oblong-ovate. Audley End. Leaves, July 22. Leefe, 44.

15. *S. aurita*, Linn. Round-eared Sallow. E. B. 1487, L. C. 1011. Stem bushy, height variable, three-four feet or more, branches spreading, brownish, downy and leafy when young. Leaves obovate, pointed (point recurved), tapering at the base, wrinkled margin, crisp, and coarsely serrate. Stipules variable in size and shape, but strongly nerved, toothed, and wrinkled. Catkins before the leaves, nearly sessile. Fruit ovate, or ovate-lanceolate, downy or silky all over, pedicelled. Style nearly obsolete; stigmas ovate, finally cleft. In turf bog. Audley End. Catkins, April 3. Leaves, July 19. Leefe, 45.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—700 yards. T. 51°—40°.

Var. *β.* *S. caprea pumila*, Ray. Not more than eighteen inches high. Richmond. Catkins, April 23. Leaves, July 23. Ward, 47.

SECT. V.—*Caprea*. (See p. 337.)

16. *S. caprea*, Linn. Round-leaved Sallow. E. B. 1488, L. C. 1012. Tree, with spreading branches, and downy young shoots. Leaves ovate, or elliptical, or obovate, pointed, crenate-serrate, on short, downy footstalks, glaucous beneath, downy on both sides, but especially on the under side and the midrib. Catkins ovate, nearly sessile, numerous, crowded. Fruit ovate at the base, lanceolate or subulate, silky, with very short styles and cleft stigmas. Dry woods and hedges. Catkins, March 30. Leaves, June 13. Easby, Richmond. Ward, 64.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—700 yards. T. 52°—41°.

Var. *a.* *S. sphacelata*, Sm. E. B. 2333. A small tree or bush. Leaves ovate, or oblong, or elliptical, greyish, with an oblique point, more downy and white than in the typical form, and not so large. Richmond. Catkins, April 6. Leaves, June 9. Ward, 66.

17. *S. nigricans*, Fr. Dark Broad-leaved Willow. E. B. 1213, L. C. 1013. Shrub bushy, with erect, stout, rather brittle branches. Leaves elliptic, crenate, dentate, tapering at both ends, smooth above, glaucous, and slightly hairy below. Catkins oblong-ovate, peduncled, appearing with the leaves. Fruit ovate-lanceolate, downy, pedicelled,

with a moderately long style. Stigmas cleft. Norfolk, Hereford. Shrub. Catkins, May 7. Ravensworth, Richmond. Ward. Labelled, *S. hirta*, Sm. *S. nigricans*, Fr. and Sm., *forma nemorosa* (woodland form).

A. 10, C. 20. Lat. 51°—58°. Alt. 0—80 yards. T. 48°—39°.

Var. *α*. *S. hirta*, Sm. E. B. 1404. Leaves elliptic-ovate or obovate, deeply crenate, with short, abrupt points, more or less downy. Catkins thick, ovate, or cylindrical, obtuse, very downy, subtended by small hairy bracts. Style moderately long, with cleft stigmas. Yorkshire. Tree. April, May.

Var. *β*. *S. cotinifolia*, Sm. E. B. 1403. Young shoots downy. Leaves oval-roundish (broadly elliptical or cordate), slightly toothed. Catkins ovate, densely downy. Style cleft.

Var. *γ*. *S. nigricans*, Sm. E. B. 1213. Leaves elliptic-lanceolate, crenate, glabrous, rib downy. Fruit downy, subulate, on a short, downy pedicel. Style smooth.

Var. *δ*. *S. andersoniana*, Sm. E. B. 2343. Young shoots downy. Leaves elliptical, acute, finely serrated. Stipules semi-ovate. Catkins short, ovate or oblong, slightly stalked. Pedicel long. Fruit smooth, rounded at the base, constricted. Style stout.

Var. *ε*. *S. damascena*, Forbes. E. B. 2709. Young shoots densely hairy. Leaves ovate or rhomboidal, or oblong, with blunt teeth. Fruit smooth, stalked, tapering. Style long. Stigma deeply cleft.

Var. *ζ*. *S. forsteriana*, Sm. E. B. 2344. Leaves obovate or oblong-elliptic, crenate or serrate, slightly downy, glaucous beneath. Catkins cylindric-elongate, stalked. Fruit hairy, lanceolate, on a pedicel longer or as long as the woolly scale.

Var. *η*. *S. petrea*, And. E. B. 2725. Leaves narrower than in any of the above forms, oblong-elliptic or obovate, tapering at the base, with short points, serrate-crenate above the base, entire at and near the tips, glabrous, the young leaves hairy or silky below. Catkins large, cylindrical, blunt; scales furnished with long silky hairs. Fruit silky at the base, ovate-tapering, wrinkled, with a short style, and shortly cleft stigmas. Richmond, Yorkshire. May.

Var. *θ*. *S. rupestris*, Donn. Anderson, in "Bot. Gaz.," says that *S. phylicifolia*, Linn., does not belong to the group *Nigricantes*. Silky Rock Sallow. E. B. 2342. Stems prostrate. Leaves oblong or obovate, shortly pointed, slightly serrated, silky on both sides but chiefly below. Catkins small, ovate, with densely silky scales. Fruit ovate-acuminate, clothed with silky hairs. Styles short, smooth or hairy. Stigmas cleft, spreading. Richmond, Yorkshire. Catkins, April 23. Leaves, August 31. Ward, 70.

Var. *ι*. *S. propinqua*, Borr. E. B. 2729. Young shoots slightly pubescent. Leaves elliptical, toothed, or crenated, scarcely downy, pale green above, glaucous beneath. Fruit ovate-lanceolate, smooth, on short hairy stalks. Style long. Stigmas notched. Wensley, Yorkshire. Catkins, May 23. Leaves, July 14. Ward, 75.

On this plant Anderson remarks, in "Bot. Gaz.," *ibidem*, "*Mihi S. phylicifolia videtur*" (It seems to me *S. phylicifolia*).

18. *S. phyllicifolia*, Linn. Tea-leaved Willow. E. B. 1958, L. C. 1015. Low spreading bush, with long, recumbent, divaricated, rooting branches. Leaves oblong, with short, acuminate, somewhat curved points, serrated with sharp teeth, and undulated at the edges. Stipules semi-ovate. Catkins solitary on lateral branches. Fruit densely silky, lanceolate, style smooth, long. Stigmas cleft, half as long as the style. The description above is that of 74 *S.* (?), which Dr. Anderson, in the "Bot. Gaz.," states to be a cultivated form of *S. phyllicifolia*, Linn. Richmond, Yorkshire. Catkins, May 7. Leaves, July 7. Ward, 74.

Note.—L. C. 1015 is quoted from the 4th edition of the "London Catalogue." This No. in the "Cybele," stands before *S. bicolor*.

19. *S. bicolor*, Ehrh. *S. laurina*, Sm. Shining Dark-green Willow. E. B. 1806, L. C. 1014 (?). Tree or shrub, with erect, round, wand-like, leafy branches. Leaves ovate-elliptical or obovate, with a short point, serrated, smooth, rigid, glaucous beneath. Stipules half-cordate, acute, serrate. Catkins earlier than the leaves, on short stalks, subtended by a few ovate silky bracts (floral leaves). Fruit ovate lanceolate, on a short pedicel, invested with white down. Shrub or tree. Catkins, April 3. Leaves, August 24. Richmond. Ward, 73. "Leaves more coarsely serrated and less pubescent beneath than in my specimens."—Borrer.

A. 9, C. 20, Lat. 51°—58°. Alt. 0—800 yards. T. 49°—39°.

Var. *a.* *S. tenuior*, Borr. E. B. 2650. *S. phyllicifolia*, Linn., And. in "Bot. Gaz." Leaves oblong or obovate, tapering at the base, with very short points, widely serrulate, nearly glabrous above, hoary-glaucous beneath. Catkins ovate, downy. Fruit ovate-acuminate, downy; style nearly half the length of the fruit, smooth. Stigmas cleft. Richmond, Yorkshire. Shrub. Catkins, April 29. Leaves, August 12. Ward, 72.

Var. *β.* *S. bicolor*, Sm. Leaves elliptical-oblong, widely serrulate. Stalk of the fruit shorter than the scale. Fruit crowned with the short smooth style, and short thick stigmas.

Var. *γ.* *S. laxiflora*, Borr. E. B. 2749. Shrub erect. Leaves broadly ovate or obovate, tapering toward the base, slightly toothed. Catkins lax, nearly sessile. Fruit turgid and smooth below, constricted and rounded above, on a stalk not quite half as long as the scale. Style stout; stigmas deeply cleft.

Var. *δ.* *radicans*, Sm. E. B. 1958. Leaves elliptical-lanceolate, broader above, with long, shallow, often wavy, serratures (teeth and notches), pointed, tapering at the base. Fertile catkin lax, erect, on a round, bent stalk. Fruit lanceolate, on a stalk about one-third the length of the scale.

Var. *ε.* *Borreriana*, Sm. E. B. 2619. Leaves broadly lanceolate, with shallow notches and blunt teeth, very smooth and glaucous beneath. Catkins ovate, lax; scales long, acute, shaggy. Fruit lanceolate; style long. Stigmas linear, cleft.

Var. *ζ.* *S. Davalliana*, Sm. E. B. 2701. Leaves obovate, lanceolate, slightly toothed, with a sharp reflexed point. Fertile catkins

an inch long, stalked; upper half of the scale black. Fruit ovate, tapering, on short stalks.

Var. η . *S. tetrapla*, Walk. E. B. 2702. *S. phylicifolia*, Linn., And. in "Bot. Gaz." Leaves obovate or elliptical-obovate, obsoletely serrate slightly hairy, glaucous beneath. Catkins large, cylindrical. Fruit shaggy, ovate, cylindrical, with a short, smooth style, and a silky pedicel. Catkins, April 29. Leaves, June 20. Richmond, Yorkshire. Ward, 85.

Var. θ . *S. weigelliana*, Willd. E. B. 2656. *S. phylicifolia*, Linn., And. in "Bot. Gaz." Leaves broadly elliptical, or roundish, with a short point, smooth, glaucous beneath, slightly crenate. Leaves of the fertile plant narrower, elliptical, tapering at both ends. Male catkins ovate, lax, on silky pedicels; scales densely silky. Fruit ovate, lanceolate, densely silky, on long, spreading, silky pedicels. Catkins, April 19. Leaves, June 17. Richmond, Yorkshire. Shrub. Ward, 78.

Var. ι . *S. tenuifolia*, Linn. E. B. 2795. Young shoots and petioles densely pubescent. Leaves elliptical or oblong, serrated, with a recurved point, slightly hairy. Catkins on a short stalk, oblong or cylindrical. Fruit smooth, on a smooth stalk. Style as long as the stigmas. (See Borrer, in E. B. 2795.)

Var. κ . *S. nitens*, And. E. B. 2655. Leaves elliptical or oblong, tapering at the base, with short abrupt points, slightly crenulate or serrulate, smooth, glaucous beneath. Fertile catkins cylindrical, on short peduncles. Fruit ovate-lanceolate, densely silky. Style short; stigmas cleft. Richmond, Yorkshire. Shrub. April.

Var. λ . *S. croweana*, Sm. E. B. 1146. *S. phylicifolia*, Linn., And. in "Bot. Gaz." Leaves elliptical, pointed, tapering at both ends, crenate-serrate, smooth, glaucous beneath. Barren catkins short, cylindrical, on short stalks. Stamens united half-way up. Fruit ovate-lanceolate, densely shaggy. Style short. "The same as Smith's plant."—Borrer. Richmond, Yorkshire. Catkins, April 30. Leaves, August 18. Ward, 83.

Var. μ . *S. floribunda*, Forbes.

Var. ν . *S. phyllereifolia*, Borr. E. B. 2660. Leaves elliptic-lanceolate, tapering at each end, strongly serrate, smooth, glaucous beneath. Young shoots downy; scales hairy, black on the upper half. Fruit smooth, pedicelled.

Var. ξ . *S. dicksoniana*, Sm. E. B. 1390. Leaves elliptical, acute, smooth, crenate-toothed. Catkins ovate, short, erect. Fruit ovate, stalked, silky; style short. Stigmas thick, notched.

Note.—Smith describes *S. phylicifolia*, Linn., *S. weigelliana*, Willd., E. B. 2656, as a low, spreading, smooth bush. Leaves roundish, broadly elliptical, ovate or obovate, with a very short oblique point, slightly or widely serrated or crenated, smooth on both sides, shining above, glaucous beneath. Barren catkins ovate or cylindrical, sessile, or on short pedicels, subtended by a few small, ovate, pointed leaflets. Filaments long, distinct; scales densely clothed with long, silky, or shaggy hairs. Fruit silky. Finlarig, Breadalbane.

Var. *β. S. nitens*, And. E. B. 2655. Young shoots reddish. Leaves ovate or elliptical, acute serrated or crenated, smooth, nerves depressed. Catkins on short stalks, thickish, cylindrical. Fruit turgid below, tapering above, downy, Style smooth.

Note.—The section *Nigricantes* has leaves of a darker hue, thinner texture, more pubescence (downiness), hoariness, than the same organs in section *Bicolores*. The straight-pointed stipules (when present), subulate fruit (ovary), and long style are distinctive characters of section *Nigricantes*.

SECT. VI.—*Frigidæ*. (See p. 337.)

20. *S. hastata*, Linn. *S. malifolia*, Sm. Apple-leaved Willow. E. B. 1617, L. C. p. 16. Shrub large, with spreading, crooked, brittle branches. Leaves broadly elliptical, thin, smooth, glaucous beneath, crenated. Stipules large, cordate, as long as the petioles. Catkins ovate or cylindrical, subtended by lanceolate, ciliate bracts; scales shaggy. Fruit shortly stalked, lanceolate, acuminate, smooth. Style long; stigmas cleft. Sands of Barrie. Catkins, May.

A. 3, C. 3. Lat. 51°—57°. Alt. 0—50 yards. T. 49°—47°.

21. *S. Lappinum*, Linn. *S. glauca*, *S. arenaria*, *S. stuartiana*, Sm. Shaggy, Downy, &c., Mountain Willow. E. B. 1810, 1809, 2586, L. C. 1022. Shrub two-three feet high. Branches spreading, reddish, with densely downy young shoots. Leaves elliptic-lanceolate or ovate-lanceolate, tapering, downy, densely cottony or silky beneath. Fertile catkins ovate, on very short stalks or sessile. Fruit ovate-lanceolate, shaggy, tomentose (cottony) or nearly glabrous. Stigmas linear, cleft. Mountains in Scotland. June(?)—August.

A. 6, C. 12. Lat. 54°—60°. Alt. 200—850 yards. T. 46°—39°.

Var. *α. S. glauca*, Sm. E. B. 1810. Stem bushy, stout, with brown or yellow spreading branches. Leaves two inches long, elliptic-lanceolate, nearly smooth and green above, cottony beneath. Fruit ovate, with a thick downy covering, sessile when young, shortly pedicelled when ripe; style short.

Var. *β. S. arenaria*, Sm. E. B. 1809. Leaves ovate-lanceolate, pointed, on short petioles, densely woolly on both sides, but whiter beneath. Fruit ovate, pointed, shaggy. Seeds cylindrical, with long, white, silky hairs.

Sub-var. *S. stuartiana*, Sm. E. B. 2586. Leaves ovate-lanceolate, tapering at both ends, grey, with hairs above, flat when full grown.

22. *S. repens*, Linn (?). Creeping Willow. E. B. 183, L. C. 1017. Stem mostly under ground, creeping, with erect or ascending branches. Leaves on very short petioles, small, oblong, oblong-ovate or lanceolate, entire or toothed, upper surface glabrous or downy, lower surface silky, with a small oblique point. Stipules lanceolate, sharp pointed. Spikes small, ovate, sessile or on short stalks, appearing before the leaves. Fruit downy or glabrous, on a pedicel twice

as long as the gland (bract). Stigmas oblong, usually cleft. On moist sandy heaths and commons. Perennial. May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—700 yards. T. 52°—40°.

Var. *a. S. repens*, Sm. E. B. 183. Stems depressed, with ascending branches. Leaves elliptical-lanceolate or oblong-obovate, margin reflexed, slightly toothed, nearly entire, with a small, oblique point, slightly downy on the upper face, silky on the under. Fruit downy or shaggy. Style very short. Moist heaths. Catkins, April 30. Richmond. Ward, 86.

"*S. repens*, Linn. Koch. Male plant, leaves an inch and a half long, and half an inch broad, slightly toothed, with a straight point, and rather large denticulated stipules."—Leefe.

Var. *β. S. fusca*, Sm. E. B. 1960. Stem procumbent. Leaves elliptical or oblong-ovate, toothed, glaucous and silky beneath. Catkins numerous, nearly sessile, ovate. Filaments more than twice as long as the scale. Fruit lanceolate, silky, on long pedicels.

Var. *γ. S. prostrata*, Sm. E. B. 1959. Stem prostrate, with elongated, ascending branches. Leaves elliptic-oblong, with a somewhat twisted point, edges revolute, downy above, downy or silky, and glaucous below. Fruit silky, in ovate sessile catkins. Heathy places. Catkins, April 30. Ward, 87.

Var. *δ. S. ascendens*, Sm. E. B. 1962. *S. foetida*, "English Flora." Leaves oblong or elliptical, with a small straight or oblique point, margins revolute, entire, or slightly toothed, somewhat silky on both sides, but mostly beneath. The plant has a rank fishy smell (Sm.) Catkins, May 7. Leaves, July 3. Richmond. Ward, 88.

Var. *ε. S. incubacea*, E. B. 2600. Leaves elliptic-lanceolate, nearly entire, revolute, with a twisted point, silky and glaucous beneath. Stipules ovate, acute. Catkins stalked. Fruit ovate-elongate, constricted on a stalk as long as the scale.

Var. *ζ. S. argentea*, Sm. (?) E. B. 1364. Stem spreading, with ascending, downy, leafy branches. Leaves elliptical, ovate or obovate, roundish, margin entire and reflexed, point small, broad, curved, downy and green above, silky and white beneath. Catkins lateral, sessile or slightly pedicelled. Fruit densely woolly or silky, swollen at the base. Style short, afterwards elongated and equal to the stigmas. Sands of Barrie. Gardiner, 89. "Very variable in the form of its leaves."—Leefe. Sea-shore, among loose blowing sand. Catkins, May.

Range, &c., undetermined.

22*. *S. ambigua*, Ehrh. Ambiguous Willow. E. B. 2733, L. C. 1016.

Var. *a. minor*. Shrub, straggling branches, procumbent or rising a foot or two feet from the ground. Leaves oblong or obovate, crenated with more or less prominent, and more or less distant, teeth, with very oblique points, of an ashy-green colour, nearly smooth above. Stipules minute, slightly arched and glandular. Catkins before the leaves, cylindrical, about half an inch long, on short stalks, lateral and terminal. Fruit ovate, elongated, slightly constricted, covered with

dense silky hairs, on a stalk half as long as the woolly scale. Style very short. Stigmas cleft. Catkins, April 25. Epping Forest, Essex.

Koch says it is a hybrid between *S. aurita* and *S. fusca*.

Var. *β. major*. Differs from the typical form chiefly in its erect growth, larger leaves, &c. (See *S. ambigua*, var. *minor*, p. 347.)

Var. *γ. spathulata*. Leaves elliptical-lanceolate, serrated with very oblique points.

Var. *δ. undulata*. Leaves lanceolate-linear. Stipules stalked. Stalk of fruit nearly as long as the scale. Style longer than in the above varieties.

23. *S. rosmarinifolia*, Linn. Rosemary-leaved Willow. E. B. 1365, L. C. 1019. Shrub slender, erect, two-three feet high. Young branches silky, leafy. Leaves linear-lanceolate, margin entire, slightly glandular, silky and shining beneath, point straight. Stipules, when present, lanceolate. Barren catkins, short, ovate; fertile ones oblong, short, lax. Fruit ovate, acuminate, silky; style thick, about as long as the cleft stigmas; scales short, woolly. Moist sandy ground in the north.

A. 7, C. 7. Lat. 50°—58°. Alt. 0—400 yards. T. 49°—42°.

Note.—Both the name and number of this species have disappeared from the 5th edition of L. C., 1857.

24. *S. doniana*, Sm. Rusty-branched Willow. E. B. 2599, L. C. 1020. Shrub five-six feet high, with erect, reddish-brown branches. Leaves obovate-lanceolate, uniform, tapering at the base, margins entire or only slightly denticulate, with a short, straight point, green and smooth above, glaucous finely downy, or silky beneath, with a prominent midrib. Catkins erect, cylindrical, pubescent, numerous, shortly stalked, subtended by three-four silky elliptical leaflets. Fruit ovate, conical, stalked, silky; style very short. Stigmas minute. Sent from Scotland as British by Mr. George Don, of Forfar. Mr. Borrer, "English Flora." Catkins, May.

A. 1, C. 1. Lat. 56°—57°. Alt. (?). T. 47° or 46°.

25. *S. angustifolia*, Wulf. Koch. *S. arbuscula*, Sm. Little Tree-Willow. E. B. 1366, L. C. 1018. Stem erect, a foot high. Leaves linear-lanceolate, with minute glandular teeth, silky when young, afterwards glabrous, under side glaucous. (On strong radical shoots the leaves are ovate, Sm.) Catkins ovate, erect, on short stalks, numerous. Fruit ovate, acuminate, stalked, densely silky; style short. Stigmas broad, obtuse, tawny. Scotland. Catkins, April.

A. 4, C. 6. Lat. 55°—60°. Alt. 500—800 yards. T. 45°—41°.

26. *S. arbuscula*, Linn. Fries. Koch. L. C. 1021. Leaves lanceolate, acute or ovate, or slightly obovate, margin remotely or closely serrated, point short, smooth, shining above, glaucous beneath. Catkins lateral, on leafy stalks. Fruit sessile (when mature, on short pedicels), downy, oblong or ovate-conical; style elongated. Stigmas bifid. Highlands of Scotland.

A. 4, C. 6. Lat. 55°—60°. Alt. 500—800 yards. T. 45°—41°.

Var. *α. S. vacciniifolia*. Sm. E. B. 2341. Stems decumbent.

Leaves lanceolate-ovate, glabrous above, glaucous and silky beneath, serrated. Fruit ovate, silky.

Var. β . *S. carinata*, Sm. E. B. 1363. Leaves elliptic-ovate, minutely and closely toothed, smooth on both sides, keeled and folded. Fruit ovate or oblong, very silky; style short; stigmas notched.

Var. γ . *S. prunifolia*, Sm. E. B. 1361. Shrub bushy, two-three feet high. Leaves ovate, serrated, glabrous and glaucous beneath. Fruit ovate, sessile, covered with long silky white hairs; style short; stigmas notched.

Var. δ . *S. venulosa*, Sm. 1362. Stem erect, much branched. Leaves ovate, smooth, reticulated, with prominent (depressed?) veins (nerves) above, somewhat glaucous beneath. Fruit ovate, silky.

27. *S. lanata*, Linn. Woolly Broad-leaved Willow. E. B. 2624, L. C. 1025. Stem much branched. Leaves broadly ovate or obovate, oval or elliptical, shortly pointed, hoary, with long, soft, silky, shaggy hairs, reticulated. Catkins large, cylindrical, sessile, lateral or terminal; scales beautifully covered with long shaggy hairs. Fruit smooth, sessile, conical, tapering. Style nearly as long as the fruit. A very beautiful shrub. The fertile catkins are said to be sometimes a span long. Glen Dole and Glen Callater, Clova Mountains. Shrub. May.

A. 1, C. 2. Lat. 56° — 57° . Alt. 800—900 yards. T. 39° — 38° .

28. *S. myrsinites*, Linn(?). Green Whortle-leaved Willow. *S. myrsinites*, Sm. E. B. 1360, L. C. 1023. Shrub erect, one-two feet high. Branches thick, spreading; young shoots hairy. Leaves elliptical or ovate, serrated, smooth and glossy (the young leaves are silky). Catkins short, oblong, lax, nearly terminal, on stout leafy stalks. Scales short, woolly. Fruit ovate, downy. Style short(?). Stigmas deeply cleft. Highlands. Catkins, June.

A. 1, C. 4. Lat. 56° — 58° . Alt. 800—900 yards. T. 39° — 38° .

29. *S. procumbens*, Forbes. Oval Rigid-leaved Willow. E. B. 2753, L. C. 1024. Shrub low, procumbent, branched, never quite erect. Branches diverging, mostly on one side of the stem. Leaves oval-roundish, slightly serrated, recurved, smooth and shining on both sides. Catkins almost terminal, on long, hairy, leafy stalks, thick, cylindrical; scales short, woolly. Fruit on very short stalks (nearly sessile), somewhat quadrangular, tapering, downy. (Spikes about half an inch long, containing each about six sets of seeds.) Style short. Stigmas deeply cleft. Highlands of Scotland. Catkins, June(?).

A. 2, C. 4. Lat. 56° — 58° . Alt. 800—900 yards. T. 39° — 38° .

Var. α . *S. ramosissima*. Erect, taller than either *S. procumbens* or *S. herbacea*, very much branched and bushy, grass-green, but touched with red on the spikes. Spikes somewhat lanceolate, about an inch long, containing six sets of seeds.

SECT. VII.—*Glaciales*. (See p. 337.)

30. *S. reticulata*, Linn. Wrinkled Willow. E. B. 1908, L. C. 1026. Very small shrub. Stems prostrate in patches; branches

ascending. Leaves orbicular (round) or obovate, entire, sometimes notched at the end, wrinkled above, deep-green, shining, glaucous-whitish beneath, with prominent reticulate veins. Catkins cylindrical, dense, many-flowered, with obovate slightly woolly scales. Fruit ovate, very downy or cottony. Stigmas nearly sessile, deeply cleft. Mountains, north of England, Wales, and Scotland. Shrub. June.

A. 2, C. 4. Lat. 56° — 59° . Alt. 850—1100 yards. T. 39° — 36° .

31. **S. herbacea**, Linn. Dwarf Willow. E. B. 1907, L. C. 1027. Roots woody, often from one-two feet long. Stems woody, slender, one-two inches high, quite erect, unless borne down by the weight of the fruit, then partly recumbent, branched, smooth, glaucous-green. Leaves round or nearly so, serrated or crenate, smooth and shining, beautifully reticulate on both sides on short stalks. Catkins terminal, few-flowered, ovate or cylindrical, with ovate, obovate, or orbicular, fringed, yellowish scales. Fruit ovate, tapering, shortly pedicelled, reddish, two-three inches long, and one-fifth of an inch thick, containing twelve-fifteen sets of seeds. On the tops of the English, Welsh, and Scottish mountains, in a micaceous soil.

A. 9, C. 20. Lat. 52° — 60° . Alt. 500—1450 yards. T. 41° — 32° .

Note.—*S. procumbens* is a distinct species. *S. radicans* and *S. lignosa* are distinct from *S. herbacea*; whether from each other not decided.—“Bot. Gaz.” No. XXVII., pp. 29, 30, &c.

II. **Populus**, Linn. Poplar. Lofty trees, with stipulate, stalked, roundish, angular or lobed leaves. Flowers of both kinds, ammentaceous (in catkins), dicecious. Scales of both male and female flowers lacerated (incised or laciniated). Perianth tubular below, with a dilated, undivided, cup-shaped limb. Male flower with eight or more stamens, and large, drooping, four-angled anthers. Female flowers with an ovate, pointed ovary; no style, and four-eight sessile stigmas. Fruit follicular (capsular), one-celled, sometimes two-celled, caused by the involute margins of the follicle. Seeds numerous, each crowned with a tuft of fine hair. The lofty growth, stipulate leaves, gummy buds, and large cylindrical catkins, may in general serve to determine this genus. In some species the wood is very soft, but in all of them it is of a fine and close grain, and not liable to splitting.

1. **P. alba**, Linn. White Poplar. Abele. E. B. 1618, L. C. 995. Large tree, with spreading branches and smoothish bark. Leaves *angular, usually with three principal lobes*, toothed, blunt, dark-green, and smooth above, densely cottony, and very white beneath; leaves of the young shoots almost palmate. Male flowers in cylindrical pendulous spikes (catkins). *Stigmas four*. Wood soft and tough. Chiefly in moist places, meadows, and low pastures. March and April.

A. 12, C. 40. Lat. 50° — 56° . Alt. 0—200 yards. T. 52° — 46° .

2. **P. canescens**, Sm. Gray Poplar. E. B. 1619, L. C. 996. This tree is usually taller than the last, with smooth bark, and more erect and compact branches. Leaves *rounded, toothed, or lobed*, not so cottony and white on the under side as *P. alba*. *Stigmas eight*.

Wood closer than that of the other British Poplars. Is it distinct from *P. alba*? In parks and woods. March, April.

A. 10, C. 30. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—48°.

3. *P. tremula*, Linn. Aspen. Quaking Ash. E. B. 1909, L. C. 997. A rather tall tree, with suckers as the two foregoing species. Leaves rounded, toothed, and scalloped, with a little terminal point, green on both sides; the leaves of the young shoots or young branches downy below. Leaf-stalks long, vertically compressed, hence the leaves are easily moved horizontally; they have a tremulous rather than undulate motion. *Stigmas four, erect, with small, reflexed auricles at their base.* Woods and hedges. March, April.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—550 yards. T. 51°—41°.

4. *P. nigra*, Linn. Black Poplar. E. B. 1910, L. C. 998. A lofty spreading tree, without suckers. Leaves twice as long as their foot-stalks, triangular (deltoid) or quadrangular, serrated, tapering, and pointed, quite smooth. Catkins long, lax, pendulous. Stamens eight. *Stigmas four, spreading.* Damp places. March.

A. 14, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

ORDER XXXIV.—CORYLACEÆ. (*Cupuliferae*, Rich.)
THE NUT-TREE, OR HAZEL FAMILY.

Trees or shrubs. Leaves simple, alternate, stipulate. Inflorescence amentaceous or aggregate, unisexual. Male flowers in aments. (See Sect. 23, p. 20.) Female flower sometimes in aments, sometimes aggregate. Stamens five-twenty, inserted into the base of the ament scales, or into that of a membranous calyx. Ovaries inferior, crowned by the calyx, and enclosed by a coriaceous involucre or capsule, with several cells in each; the greater part being abortive. Ovules twin or solitary, pendulous. Stigmas several, distinct. Fruit, a bony or coriaceous one-celled nut, more or less enclosed in the involucre. Seeds one, or two, or three, pendulous. This order is known by their amentaceous flowers, by their fruit enclosed in an indurated cup or involucre, and by the peculiar nervation of their leaves. (See Sect. 16, p. 12.)

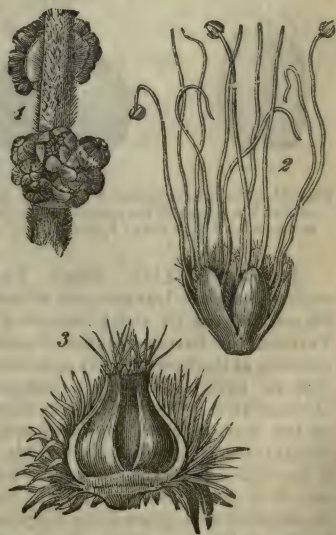


Fig. 135.—*Castanea vulgaris*. 1, a portion of catkin of male flower; 2, a single male flower magnified; 3, a female flower in its prickly cup; the anterior part is removed.

Both timber and bark of several

species are valuable, and their fruit is of considerable importance. They are found in all temperate parts of the world, and are very common in Europe, Asia, and North America.

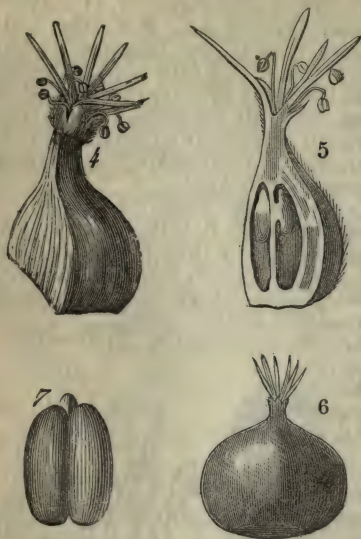


Fig. 135.—*Castanea vulgaris*. 4, a female flower entire; 5, a section of the same, showing the inferior fruit; 6, ripe fruit; 7, the embryo.

SYNOPSIS OF THE GENERA.

Fagus. Male flowers in glo-bular catkins, pendulous, on long peduncles. Fruit with two acute angles.

Castanea. Male flowers in filiform, interrupted catkins, erect. Fruit flat on one side, and convex or bluntly angular on the other.

Quercus. Involucre in six-eight ciliated divisions, bearing the stamens on its base. Involucre of the fruit indurated, surrounding the base of the acorn.

Corylus. Female flowers in a scaly bud; involucre ciliated, toothed at the apex.

Carpinus. Female flowers in clusters; involucre of the fruit one-sided (unilateral) three-lobed; middle lobe larger than the lateral ones.

I. *Fagus*, Linn. Beech. Large trees, with hard wood. Leaves stalked, more or less serrated or toothed, or wavy. Flowers axillary; barren flowers in short, roundish catkins, the fertile ones in pairs. Perianth of barren flowers five-six-cleft, bearing from five-twenty stamens at the base of a five-six-divided, bell-shaped involucre. Female flowers one-three, in an exterior prickly four-lobed involucre. Ovaries two or three inferior, three-angled, three-celled. Involucre of the fruit woody, furnished with spines (the indurated ends of bracts) enclosing one-three carpels, and opening by four valves. Fruit a one-celled nut, one, or rarely two-seeded. The prickly involucre, which is coriaceous within, and the sharply angular nut sufficiently distinguish this genus from *Carpinus*.

***F. sylvatica*, Linn.** Beech. E. B. 1846, L. C. 989. Bark of stem smooth, greyish white. Leaves petiolate, ovate or oblong, usually pointed or acuminate, laxly toothed, coriaceous, with prominent nerves. Petioles and peduncles downy, silky. Fruit brown, shining, with three sharp angles. Tree. Flowers, April. Fruit, July, August.

A. 11, C. 30. Lat. 50°—54° (56°). Alt. 0—200 yards. T. 51°—47°.

II. Castanea, Tourn. Chestnut. Lofty trees, with strongly-toothed leaves. Male flowers sessile, erect, prickly, in *filiform interrupted catkins*. Stamens eight-fifteen, on a glandular disk, exceeding the involucre. Female flowers one-five, in an urceolate, somewhat four-lobed involucre. Fruit flat on one side, convex on the other. Cotyledons large, farinaceous. (See Fig. 135, 7.)

C. vulgaris, Lam. Common Chestnut. E. B. 886. Large trees, with spreading branches. Leaves large, petiolate, oblong-lanceolate, pointed or acuminate, with sharp teeth, leathery, glabrous, with prominent, parallel nerves. Male catkins very long. Fruit large, brown, shining. Flowers in May and June. Fruit, September. Alien.

III. Quercus, Linn. Oak. Large trees, with deciduous or evergreen leaves. Male flowers in a long and lax interrupted catkins. Female flowers solitary. Scale of male flowers cleft, bearing eight or more stamens, with roundish anthers. Perianth of female flowers adhering to the ovary, in six minute segments. Ovary three-celled, with two rudimentary seeds in each. Style single, with three recurved stigmas. Fruit a nut, ovate or oblong, one-celled, one-seeded, surrounded at the base by a hemispherical, coriaceous, scaly or tuberculated involucre (cupule).

1. **Q. sessiliflora**, Sm. Sessile-fruited Oak. E. B. 1845, L. C. 988 c. Leaves petiolate, glabrous, or downy, oblong or obovate, truncate or tapering at the base, sinuated or lobed; lobes unequal, blunt. Peduncles of the fruit shorter than the petioles, or about the same length. Fruit ovate.

Var. *B. pubescens*. Leaves downy-hoary when young.

Sub-var. *laciniata*. Leaves deeply pinnatifid. Acorn small. Woods. Tree. April, May. Fruit, August, September.

A. 17, C. 70. Lat. 50°—59°. Alt. 0—300(?) yards.

2. **Q. pedunculata**, Ehrh. *Q. robur*, Sm. E. B. 1342, L. C. 988 a. Leaves on short petioles, or nearly sessile, pale green below. Peduncles of the fruit very long. Scales of the cup short and appressed. Tree. April and May. Fruit, August and September.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—500 yards.

3. **Q. intermedia**, Don. L. C. 988 b. Leaves on long foot-stalks. Catkins on very short peduncles. Fruit oblong. (See Leighton's "Shropshire Flora.")

The following characteristics of these assumed species are derived from the "Gardeners' Chronicle," March 1, 1857:—" *Quercus pedunculata*. Common British Oak and White Oak. Acorns generally single, in twos or threes. Fruit-stalks long. Leaves green, very deeply sinuate, short and set-like; foot-stalks very short, almost wanting, and of a reddish-green colour. Buds small and not prominent. Branches tortuous and spreading. Tree assumes a rather set and unhealthy appearance.

" *Quercus sessiliflora*. Bay Oak, Chestnut Oak, Durmast Oak, and Red Oak. Acorns generally in clusters; fruit-stalks very short. Leaves green, glossy, and shining, deeply sinuate; foot-stalks very

long, and of a yellowish green colour. Buds large and prominent. Branches upright. Tree assumes a green, healthy appearance."

IV. *Corylus*, Linn. Hazel. Trees of small size, more or less downy, with roundish, serrated leaves. Male flowers in cylindrical catkins. Female flowers aggregate, in a scaly bud. Scales of male flowers three-cleft, bearing eight or more stamens, with capillary filaments and compressed pendulous bearded anthers. Female flowers (the stigmas only are visible) bright red, filiform, in scaly buds, aggregate, surrounded by a deeply-divided, membranous, scale-like involucre, which subsequently is much enlarged. Ovary small, ovate, with two rudimentary seeds, two styles, and prominent, coloured, downy, deciduous stigmas. Fruit, a single bony nut, with a broad scar, contained in a cupule, which is more or less fleshy or leathery, and bell-shaped below, spreading, lacinate or toothed above. Seed solitary, with a fine membranous episperm.

***C. avellana*, Linn.** Hazel. E. B. 723, L. C. 991. Shrub. Branches erect, slender, flexible, downy when young. Leaves ovate-roundish, abruptly pointed, somewhat cordate at the base, toothed, sometimes lobed, or three-lobed at the apex; stipules oblong-obtuse, or oblong-lanceolate. Involucre large, surpassing the fruit, and open at the top. Tree. February, March. Fruit, August, September.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—600 yards.

V. *Carpinus*, Linn. Hornbeam. Small trees with hard wood. Leaves plaited in pefoliation, serrated, ovate. Barren flowers in cylindrical catkins, fertile ones in pendulous, bracteated clusters. Scales of barren catkins ovate, ciliated at the base, bearing ten or more stamens, with roundish, compressed, two-lobed anthers. Scales of fertile catkins large, three-lobed, two- or three-flowered. Ovary ovate, adherent, crowned by the calycine scale, with two very short, permanent styles, and two deciduous stigmas. Involucre of the fruit membranous, green, reticulated, three-lobed, the central one much longer than the two lateral ones. Fruit ovate, compressed with prominent, longitudinal ribs crowned by the permanent limb of the perianth, one-celled and one-seeded by abortion. Pericarp woody. This tree is distinguished from *Fagus* by its low stunted habit, its doubly serrated leaves, and its aggregate fertile flowers.

***C. betulus*, Linn.** Hornbeam. E. B. 2032, L. C. 990. Tree more or less erect and elevated, branches spreading. Leaves petioled, ovate, or oblong, pointed, or acuminate, rounded, or slightly cordate at the base, sharply and closely toothed; nerves prominent and parallel, hairy or downy, especially near the angles. Involucre very much larger than the fruit, one-sided, three-lobed, the central one long (unilateral), lanceolate, sometimes toothed. Hedges, coppices, woods. Flowers in May. Fruits in July, August.

A. 5, C. 20. Lat. 50°—53° (55°). (I have seen it in hedges in Aberdeenshire.—A. I.) Alt. 0—200 yards.

ORDER XXXV.—**BETULACEÆ**, Rich. THE BIRCH FAMILY.

Trees, or shrubs, with simple, alternate leaves, which have rectilinear nervation; the nerves extend from the midrib to the margin. Flowers unisexual and amentaceous. Stamens usually distinct. Ovary superior, two-celled. Fruit membranous, indehiscent, and one-celled by abortion. Seeds pendulous. This order is distinguishable from other *Amentiferae* by the absence of a cup or cupule to the female flowers, and by the two distinct cells of the fruit. They inhabit the woods of Europe, North America, and Northern Asia. The wood of some American species is very valuable.

SYNOPSIS OF THE GENERA.

Betula. Female catkins cylindrical, pendulous, and solitary; scales membranous and scarious.

Alnus. Female catkins ovate, erect, in lax clusters; scales woody and persistent.

I. *Betula*, Linn. Birch. Trees, or shrubs, with long, slender branches. Leaves stalked, simple, serrated. Flowers monoecious, in cylindrical catkins. Scales of the male flowers ternate, the middle one bearing the stamens. Stamens four, inserted on the base of an oblong, concave bract; filaments united in pairs. Scale of fertile flowers three-lobed, three-flowered, without a perianth. Ovary compressed, two-celled, with two downy cells and simple stigma. Fruit a one-celled, oblong, winged nut, single-seeded by abortion. These trees are distinguished by their long, round, slender, pendulous branches, and often by their delicately smooth, white, outer bark, which peels off in membranous layers. In aged trees the bark is very thick, and splits into deep wide fissures.

1. ***B. alba***, Linn. *B. pendula*, Roth. Common Birch. E. B. 2198, upper Fig., L. C. 993. A tall tree with a white scaling cuticle and thick bark, which is much rent or fissured in old trees. Leaves cuneate and entire at the base, broader and doubly serrated, glabrous and prominently nerved above, hairy below. Catkins cylindrical,

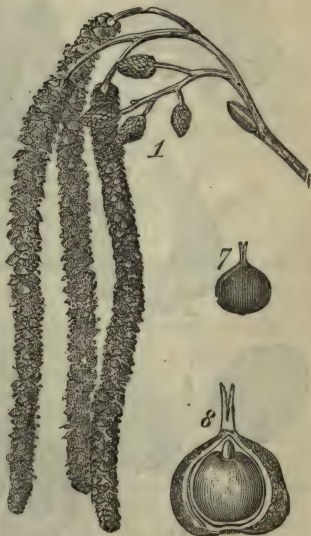


Fig. 136.—*Alnus glutinosa*. 1, catkins of male flowers, and cones of female flowers; 7, a ripe carpel; 8, section of the same.

tapering at the base. Scales of catkin lanceolate, elongate, tapering, with more or less reflexed points. One of our hardiest trees. April.

A. 18, C. 80. Lat. 50° — 60° . Alt. 0—700 yards. T. 52° — 40° .

Var. *B. glutinosa*, Fr. E. B. 2198, L. C. 993 c. A smaller tree than the former, often only a bush. Twigs slender, leafy. Leaves

entire below, broadly cuneate or truncate, rounded, abruptly acuminate, serrated, nerves not prominent above. Catkins cylindrical, ovate, shorter than in *B. alba*. Scales of the catkin ovate-rounded, not elongated and hairy as in the preceding.

B. pubescens, Koch. Leaves more or less ovate, usually glabrous (?).

2. *B. nana*, Linn. Dwarf Birch. E. B. 2326, L. C. 994. Low shrub, with procumbent spreading branches and downy shoots. Leaves small, roundish, crenate, glabrous, deeply crenate or incised, entire at the base. Catkins erect, stalked, obtuse; the barren ones lateral, the fertile ones terminal. Scales of female florets divided into three deep divisions. Shrub. April and May.

A. 6, C. 12. Lat. 55° — 58° . Alt. 550—900 yards. T. 41° — 38° .

Var. α . Fruit roundish, and scale divided to near the base.

Var. β . Fruit elliptical. Scale three-cleft.



Fig. 136.—*Alnus glutinosa*. 2, A single male flower, enlarged; 3, catkin of female flowers; 4, a scale with the two flowers at the base; 5, section of ovary, showing the two cells, with one ovule in each; 6, ripened cones.

II. *Alnus*, Tourn. Alder. Trees with stalked, simple, stipulate leaves. Flowers male and female in catkins. Male florets in loose cylindrical catkins, on the pedicel of the scale, usually three together, each with a three-four-parted perianth, bearing three-four stamens, inserted at the base of the divisions. Filaments short. Female florets, in dense ovate catkins, two together on roundish, sessile, fleshy scales, with four small scales at their base, each with a very small ovary, and two one-seeded cells. The scales of the fruit become leathery, and finally woody. Fruit one-celled and one-seeded by abortion, angular, compressed. The glutinous leaves, the red sap,

and especially the wingless fruit, distinguish the sole British species of the genus from the Birch.

A. glutinosa, Gaert. Common Alder. E. B. 1508, L. C. 992. Young branches glabrous. Leaves petiolate, roundish, obtuse, often truncate at the apex, toothed or lobed, leathery, glabrous, downy below on the angles of the nerves, glutinous when young. Scales of the fruit closely imbricated and agglutinated before maturity.

Var. *β. incisa*. Leaves deeply cut. Catkins expand in February, March. Fruit, August, September.

A. 18, C. 80. Lat. 50°—59°. Alt. 0—550 yards.

ORDER XXXVI.—MYRICACEÆ. THE GALE FAMILY.

Leafy resinous shrubs. Leaves alternate, simple. Inflorescence amentaceous. Male flowers six-eight stamens. Female flowers consisting of a one-celled ovary, surrounded by scales, with a solitary, erect ovule. Fruit fleshy, adhering to the scales of the ovary. Seed solitary. This small family may be distinguished from the amentaceous orders generally by the resinous nature of the whole plant, its glandular leaves, and its fleshy fruit. It is found in the cold parts of Europe and America. Some species are found in South America, India, &c.

Myrica, Linn. Gale. Aromatic shrubs. Leaves simple, serrated, with resinous dots. Flowers diœcious in axillary catkins. Scale of both kinds of florets ovate, concave, the male bearing four stamens, rarely more. Anthers large. Ovary ovate, flattish (compressed), free, with two styles, and simple, acute, stigma. Fruit a one-celled, one-seeded berry. Seed erect, with a fine membranous testa (shell). This genus may be distinguished by its low, bushy growth, resinous leaves, and aromatic smell, as well as by its baccate fruit. A cattle medicine is prepared from the leaves and fruit.

M. Gale, Linn. Gale. Bog Myrtle. E. B. 562, L. C. 1028. Shrub, very much branched. Leaves oblong, tapering towards the base, and narrowing into the short petioles, obtuse or pointed, slightly toothed at and near the apex, slightly pubescent, with resinous, yellow, minute globules on both sides. Scales of the male catkins brown, with a white edge. Fruit furnished with resinous glands. Bogs. Shrub. April, May. Fruit, July.

A. 17, C. 50. Lat. 50°—59°. Alt. 0.—600 yards. T. 52°—40°.

GROUP II.—**Monochlamydeæ**. Perianth single, usually herbaceous.

The monochlamydeous orders of British plants may be distinguished as below:—

Elæagnaceæ are trees or shrubs with leprous or scurfy leaves, and an irregular perianth.

The order *Thymeliaceæ* is known by its shrubby stem, tubular, coloured perianth and superior ovary, with a single ovule.

The only indigenous example of *Empetraceæ* is a small, heath-like evergreen shrub, with exstipulate leaves, minute axillary flowers, and baccate fruit.

Euphorbiaceæ (the Spurges) are mostly distinguished by their milky, acrid juice, or by their tricarpous (rarely dicarpous) fruit.

Urticaceæ by their rough alternate leaves, and their small, dry, one-seeded fruit.

Ulmaceæ (Elms), lofty trees, with winged one-two-seeded fruit.

Ceratophyllaceæ and *Callitrichaceæ* are two small orders of aquatic plants: the former with multifid cellular leaves, twelve-twenty sessile stamens (anthers without filaments), fruit a one-seeded nut, terminated by the hardened stigma. The latter (*Callitrichaceæ*) is properly an *æchlamydeous* order. The plant is minute, with entire opposite leaves, and axillary, solitary, very inconspicuous flowers (a single stamen or a pistil, for the plant is generally unisexual).

Polygonaceæ have alternate leaves with ocreaceous (boot-like) scarious stipules, and the fruit is a triangular nut.

The *Chenopods* and the British *Amaranths* are herbaceous, with inconspicuous flowers in spikes, heads, &c.

ORDER XXXVII.—**ELÆAGNACEÆ**, Rich. THE OLEASTER FAMILY.

Trees or shrubs. Leaves entire, exstipulate, generally covered with leprous scales. Inflorescence axillary. Flowers usually diœcious. Perianth of female flowers tubular, persistent. Ovary superior, one-celled, with a solitary ovule. Fruit crustaceous, enclosed in the succulent perianth. The single British species is a thorny shrub, growing near the sea, where it might, perhaps, form a good hedge. Its fruit is said to have narcotic qualities. Plants of this order are found in all parts of the northern hemisphere.

Hippophaë, Linn. Sallow Thorn. Thorny shrubs, with scaly, silvery leaves. Flowers lateral, aggregate, diœcious. Perianth of the male flower two-parted or of two sepals, bearing four stamens with very short styles, and oblong, angular anthers. Perianth of female flowers tubular, cleft, solitary. Ovary roundish, with a short style, and simple, subulate stigma. Fruit a juicy, round, one-celled berry. Seed solitary.

H. rhamnoides, Linn. Sea Buckthorn. E. B. 425, L. C. 954. A bushy shrub, with leafy branches, which end in thorns. Leaves linear-lanceolate, blunt, on short stalks, dotted above and scaly and silvery beneath. Flowers green, solitary and axillary. Fruit orange-coloured, acid. South and east sea-coasts. Shrub. May.

A. 4, C. 5. Lat. 51°—55°. Alt. 0. T. 51°—49°.

ORDER XXXVIII.—**THYMELIACEÆ.** THE MEZEREON FAMILY.

Shrubby, very rarely herbaceous plants, with exstipulate entire leaves. Inflorescence capitate or spicate, axillary or terminal, sometimes solitary. Perianth tubular, coloured, with a four-cleft, rarely five-cleft limb. Stamens definite, often eight, sometimes four-two. Ovary superior, with one ovule. Fruit hard and dry, or drupaceous. Seed solitary, pendulous. *Daphne laureola*, a genuine British species, is a handsome small evergreen, with a tuft of leaves and flowers at the summit of its slender very flexible stem. The other reputed species, *D. Mezereon*, is common in cottage gardens, and produces its pretty whorls of flowers early in the spring, usually before the appearance of its leaves. The bark of many of the species is acrid, and the fruit narcotic and poisonous. In Europe these shrubs are not common, but they abound in the cooler parts of India and America.



Fig. 137.—*Daphne Mezereon*. 1, A group of flowers; 2, a section of flower, showing the monochlamydeous flower, the stamens, and ovary; 3, the pistil, magnified; 4, section of pistil, showing the ovary and ovule; 5, the fruit; 6, section of same.

Daphne, Linn. Mezereon. Spurge Laurel. Shrubs with simple, undivided, entire, lanceolate or oblong-lanceolate leaves, with axillary, mostly sessile flowers. Flowers rose-coloured or green, perfect (hermaphrodite). Perianth tubular and cylindrical, funnel-shaped, with a four-cleft limb, withering, and finally falling off. Stamens eight, shorter than the perianth, in two rows, inserted about the middle of the tube. Style short, stigma capitate. Fruit fleshy, one-seeded, endocarp brittle. The shrubby habit, entire simple

leaves, the coloured single perianth, and one-seeded berry distinguish this genus.

1. **D. Laureola**, Linn. Spurge Laurel. E. B. 119, L. C. 955. Stem erect, round, flexible, leafy, branching at the top. Leaves oblong-lanceolate or obovate, tapering at the base, entire, glabrous, shining, *persistent*, on short petioles, alternate, *contiguous*, *forming a rosette at the summit of the stem or branches*. Flowers *greenish*, *pendulous*, in small axillary, three-seven-flowered clusters. Fruit black. Hilly, shady places, chiefly on a chalky or calcareous soil. Shrub. Perennial. April, May.

A. 12, C. 40. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

2. **D. Mezereum**, Linn. Mezereon. E. B. 1381, L. C. 956. A small shrub, with erect branches. Leaves alternate, lanceolate or oblong-pointed, tapering into the petiole, *not persisting*, as in the above species. Flowers rose-coloured, rarely white, *sessile*, in two-three-flowered fascicles along the branches; tube of perianth pubescent. Fruit red. Shrub. March. Fruit, June. Woods. Hants, Sussex, and Herts.

A. 6, C. 9. Lat. 50°—55°. Alt. 0—100 yards.

ORDER XXXIX.—**EMPETRACEÆ**. THE CROWBERRY FAMILY.

Small heath-like shrubs, with evergreen exstipulate leaves and axillary flowers. Perianth a series of imbricated scales. Stamens equal in number to the inner scales or sepals. Ovary superior, seated on a fleshy disk, three-six or nine-celled, with solitary ovules in each cell. The radiations of the stigma correspond with the cells of the ovary. Fruit fleshy, with bony cellular coating, seated in the persistent calyx. These shrubs possess acid and astringent properties, and are found chiefly in Europe and North America.

Empetrum, Linn. Crowberry. Low shrubs, with scattered or whorled, linear, revolute, evergreen leaves and axillary dioecious flowers. Perianth of both male and female flowers composed of three green and three coloured sepals, either distinct or united at the base. Stamens three-nine, with roundish, deeply-cleft anthers. Ovary, which usually occurs in fertile flowers only, superior, orbicular, with a very short style and six-nine radiating stigmas. Fruit baccate, one-celled, nine-seeded. Distinguished by its humble growth, heath-like, evergreen leaves, radiated stigma, and baccate fruit.

E. nigrum, Linn. Crowberry. E. B. 526, L. C. 960. A dwarf, trailing, heath-like shrub, with numerous leafy, smooth, ascending branches. Leaves crowded or imperfectly whorled. Flowers axillary, nearly sessile. Fruit (berries) purplish black, small. The food of the grouse and other mountain birds in the north of England and Scotland. Shrub. Flowers in May. Fruit, August.

A. 14, C. 50. Lat. 51°—60°. Alt. 0—1300 yards. T. 47°—34°.

ORDER XL.—**EUPHORBIACEÆ**, Juss. THE SPURGE FAMILY.

Trees, shrubs, or herbs. Leaves simple, rarely compound, usually stipulate. Inflorescence axillary or terminal. Flowers monœcious or diœcious. Perianth wanting (in the British species). Stamens definite or indefinite. Ovary superior, sessile, or stipitate, two-three, or many-celled; ovules solitary or twin, with a simple or lobed stigma, sometimes compound. Fruit of three, rarely two, dehiscent cells, separating with elasticity from their common axis. The British species are all herbaceous except *Buxus*, and mostly lactescent (milky). The milk is very acrid. Several of the exotic species are cathartic, and some of them produce caoutchouc, &c. The well known castor-oil is the produce of *Ricinus palma Christi*, which is sometimes cultivated as an ornamental border flower. Plants of this order abound in warm regions, especially in equinoctial America. The European genera have usually no petals.



Fig. 138.—Organs of fructification of *Euphorbia palustris*. 1, Flower; 2, single male floret; 3, single female floret; 4, a single carpel; 5, separated coecoses; 6, seed; 7, section of same, showing the embryo.

SYNOPSIS OF THE GENERA.

Euphorbia. Stems herbaceous, round; leaves scattered; fruit separating into three pieces.

Mercurialis. Stems herbaceous, branching; leaves opposite; fruit separating into two pieces.

Buxus. Small trees, with evergreen leaves and monœcious flowers (on the same plant).

Euphorbia, Linn. Spurge. Herbs or shrubs, with a copious, milky, acrid juice. Stem (in the British species) round, leafy. Leaves simple, undivided. Flowers monœcious, variable, in some axillary, in others terminal and umbellate, consisting of several monandrous florets, composed of separate jointed stamens, or stamens attached to separate columns by joints, surrounding a single pistil, and subtended by a four-five-lobed glandular involucrel. The fertile flower is on a longer stalk than the barren ones, with a roundish three-lobed ovary, three styles and bluntish stigmas. Fruit consisting of three carpels sometimes fleshy, separating elastically from the axis, each carpel

containing a solitary large seed. The British species are distinguished by their round stems, by their scattered, linear, strap-shaped, obovate, simple leaves, by their horned glandular involucels, by their fruit splitting into three pieces, and by the white, acrid, milky juice in which they abound.

SECT. I.—Glands of the involucre roundish or oblong, entire or notched, not crescent-shaped or horned.

§ 1. Seeds punctured reticulated or wrinkled.

1. **E. Helioscopia**, Linn. Sun Spurge. E. B. 883, L. C. 962. Root tapering, with branching small fibres. Stem erect, branching at the base, or quite simple. Leaves scattered, obovate, wedge-shaped, finely-toothed on their upper half, smooth, or very slightly hairy. Umbel five-rayed, each ray three-branched, and each branch simply forked. Leaves of the involucre five, one under each primary ray, larger than the leaves of the stem. Glands roundish, not quite equal. Fields, &c. Annual. May—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

§ 2. Seeds tuberculate.

2. **E. stricta**, Koch. Upright Spurge. L. C. 963. Stems erect, round, smooth, leafy, usually red or brown at the base. Leaves oblong, clasping, minutely serrated, especially near the tips. Umbels three-five-cleft, branches three-cleft and then two-cleft, there are numerous flowering branches below the umbel. Bracts of the general umbels similar to the leaves, only rather more lanceolate and pointed; bracts of the partial umbels ovate, slightly cordate at the base, ultimate (highest bracts) very broadly cordate. Fruit tubercled. Below the Wind Cliff, between Chepstow and Tintern, Monmouthshire. Annual(?). July.

A. 1, C. 1. Lat. 51°—52°. Alt. (?). T. 49°.

3. **E. platyphylla**, Koch. *E. stricta*, Sm. Broad-leaved Spurge. E. B. 333, L. C. 963. Stem erect, simple, with axillary branches twelve-fifteen inches high, leafy above, naked below. Leaves elongate, *obovate-lanceolate*, dilated or cordate at the base. Umbel three-five branched, then two-three branched. Bracts of umbel ovate-oblong. Partial bracts rhomboid-ovate, obtuse apiculate. Involucres containing seven-eight male flowers. Fruit *tubercular*. Seeds greyish-brown, roundish, obovate, shining. Corn-fields; not rare in some parts of Surrey and Kent. Annual. July.

A. 5, C. 20. Lat. 50°—53°. Alt. 0—200 yards. T. 52°—48°.

4. **E. hiberna**, Linn. Irish Spurge. E. B. 1337, L. C. 964. Stem erect or ascending, stout, round and tapering, quite smooth, slightly furrowed, with several fertile and barren branches underneath the umbel, leafy. Leaves lanceolate or oblong, blunt, shining above, pubescent on the under side, finely serrated, slightly hairy beneath. Umbel five-six-rayed, with a few flowering branches below, rays three-five-cleft. Bracts ovate-roundish. Glands roundish or

angular, carpels *muricated*, but not *warted*. Seeds obovate. Ireland and Devonshire. Perennial. June.

A. 1. Lat. 51° — 52° . Alt. 0—50 yards.

5. **E. palustris**, Linn. L. C. 965. *E. pilosa*. Hairy Spurge. E. B. 2787. Stem stout, erect, tapering, furrowed, glabrous, leafy, two-four feet high. Leaves oblong, or oblong-lanceolate, entire, *hairy on both sides, and especially at the margins*. Umbel irregular, about five-rayed, usually less elevated than the lateral fruit-bearing branches. Rays one-two times forked. Bracts of the involucre glabrous obovate, irregular, glands of the involucre *ovate* (?) or *oblong, narrowed below*. Fruit *hairy, warted*, seeds smooth, minutely punctate (?). Bath (Blind Lane, Prior Park). Annual or perennial (?). June.

A. 1. Lat. 51° — 52° . Alt. trifling. (See Watson, *in loco*.) T. 49° .

6. **E. coralloides**, Linn. E. B. 2837, L. C. 966. Stems erect, *stout*, simple, except at the top, with scattered, distant, deciduous leaves. Umbel five-cleft, with several flowering branches below. Leaves lanceolate, serrated, with minute sharp teeth, *woolly on both sides, blunt*. Bracts of the partial umbels ovate. Glands of the involucre *transversely ovate*, two-horned. Capsule globular, *densely woolly*. Seeds ovate, *compressed, smooth*. Slinfold, Sussex, where it was noticed in 1837.—A. I. Alien. Biennial (?). May, June.

SECT. II.—Glands of the involucre angular, crescent-shaped, or two-horned.

§ 1. Seeds punctured, reticulated, or wrinkled. (Annual or biennial plants.)

7. **E. portlandica**, Linn. Portland Spurge. E. B. 441, L. C. 970. Stem a foot high, round, leafy, *becoming red in autumn*. Leaves scattered, *obovate or lanceolate*. Umbel five-cleft, then two-cleft, with five broad rhomboidal bracts. Glands horned. Fruit *rough at the angles*. Seeds dotted or reticulate. Sandy sea-coast. Perennial. July—September.

A. 6, C. 15. Lat. 50° — 55° . Alt. 0. T. 52° — 49° .

8. **E. Peplus**, Linn. Petty Spurge. E. B. 959, L. C. 972. Root fibrous, branched. Stem erect, *three-forked*, with intermediate branches. Leaves scattered, nearly sessile, *obovate or oblong*, slightly notched or entire. Umbel *three-branched*, the branches repeatedly forked, with ovate bracts. Glands four, crescent-shaped, *with elongated horns*. Fruit on a short pedicel, nearly smooth, with roughish lobes, each of which has a rather deep channel and two ridges. Annual. Fields. June—October.

A. 17, C. 75. Lat. 50° — 59° . Alt. 0—350 yards.

9. **E. exigua**. Dwarf Spurge. E. B. 1336, L. C. 971. Stems *reclining at the base*, ascending or erect, several or solitary, *branching from the base*, or simple and branching above, round, smooth, leafy. Leaves scattered, *linear, pointed, entire*, smooth. Umbel *usually three*, rarely *two-five-rayed*, rays several times forked. Involucral leaves like the stem leaves. Bracts lanceolate, enlarged, and slightly

cordate at the base. Glands cruciate, with *elongated straight horns*. Fruit small, smooth. Seeds not shining, ovate, angular, wrinkled across. Common in chalky fields. Annual. June.

A. 15, C. 60. Lat. 50° — 57° . Alt. 0—200 yards. T. 52° — 47° .

10. **E. Lathyris**, Linn. Caper Spurge. E. B. 2255, L. C. 973. Stems *stout, erect*, branching above, glaucous. Leaves opposite, clasping, the alternate pairs arranged *crosswise*. Upper ones truncate or cordate at the base, ovate or triangular, pointed; leaves of the barren stems linear-lanceolate or linear-oblong. Umbel three-four-cleft, with forked branches. Involucral glands lunulate (crescent-shaped), with short blunt horns. Fruit *large, smooth*, with a prominent suture (junction line). Seeds large, obliquely truncate at the base, wrinkled when ripe, testaceous. Found rarely in shady places, apparently wild. Often naturalized. Biennial. June, July. Alien. (See "Cybele," vol. ii., p. 364.)

This species was observed in the Bedford Purlieus, Rockingham Forest, between Wansford and Kingscliffe, Northamptonshire, in 1830.—A. I.

§ 2. Seeds smooth. (Perennial plants.)

E. cyparissias, Linn. Cypress Spurge. E. B. 840, L. C. 968. Root somewhat woody, branching. Stems erect, with numerous tufted, nearly erect, *often barren branches*. Leaves numerous, scattered, *linear, or slightly narrowed at the base*. Umbel of numerous slender rays, either simple, or once or twice forked; leaves of the involucre like the stem-leaves. Bracts free, roundish, usually with a small point (mucro). Glands notched with short horns. Lobes of the fruit finely shagreened. Woods. Naturalized (?). Perennial. June. Alien.

11. **E. paralias**, Linn. Sea Spurge. E. B. 195, L. C. 969. Stems erect, round, woody, rough, with numerous irregularly disposed branches near the top. Leaves *elliptical or oblong, or elliptical-oblong*, coriaceous. Umbel five-fid, with several flowering branches below; all the branches forked, branchlets spreading, and somewhat kneed (angular). Bracts broadly *fan-shaped* or *semicircular* with a point (mucro). Glands four, lunulate, with two horns, greenish-yellow. Fruit tubercular. Seeds nearly smooth. Sea-shores. Perennial. August, September.

A. 8, C. 20. Lat. 50° — 55° . Alt. 0. T. 52° — 49° .

12. **E. Esula**, Linn. Leafy-branched Spurge. E. B. 1399, L. C. 967. Stem erect or ascending, sulcate, smooth, leafy, with several fertile branches beneath the umbel. Leaves *linear-lanceolate* or *linear*, or *oblong*, entire, or very minutely denticulate, with a reflexed point. Umbel *fifteen-twenty-rayed*; leaves of the involucre similar to the stem-leaves. Rays erect, slender, once or twice forked, bracts broadly *cordate or truncate at the base*, pointed, or very abruptly acuminate. Glands *notched, with short slightly curved horns*. Carpels not warted, but finely shagreened. Perennial. July. Woods. Scotland. Rare.

A. 2, C. 6. Lat. 55° — 56° . Alt. 0—100 yards. T. 47° .

13. **E. amygdaloides**, Linn. Wood Spurge. E. B. 256, L. C. 974. Root rather woody. Stems erect or ascending, somewhat woody and reddish below, slightly hairy above. Leaves scattered, obovate-oblong, with or without a point at the apex, very numerous, and disposed in a rosette at the top of the barren stems, or about the middle of the fertile stems, tapering into a petiole; floral leaves not petioled. (On the barren stems the leaves are contiguous, and in a rosette at the top; on the fertile stems they are chiefly on or near the middle.) Terminal umbel five-eight-rayed, with once- or twice-forked rays; there are usually several axillary peduncles, either simple or forked below the umbel. Bracts roundish, united by a more or less considerable part of their base. Glands of the involucre yellow, incurved. Fruit smooth, or finely shagreened. Seeds brown or black. Woods and hedges. Perennial. May.

A. 10, C. 40. Lat. 50°—56°. Alt. 0—200 yards.

E. characias, Linn. Red Shrubby Spurge. E. B. 442. Stems woody, perennial, a yard high, leafy above, milky. Leaves numerous, scattered, evergreen, oblanceolate, pointed, tapering towards the base, entire, soft, downy. Umbel terminal, of numerous rays, with many scattered axillary flowering branches below, each ray or branch once or twice forked. Bracts broadly cordate, united at the base. Glands dark purple, with short horns. Fruit hairy, drooping. Woods, scarcely naturalized (?). Perennial. May. Alien. (See "Cybele," *in loco*.)

E. salicifolia, Host. Willow-leaved Spurge. Root creeping. Leaves lanceolate, attenuated both ways, quite entire, densely pubescent. Leaves of the involucre rhomboid or triangular-ovate, blunt, shortly acuminate or mucronate, their breadth greater than their length. Umbels many-rayed; rays repeatedly forked. Glands two-horned. Fruit scabrous, punctate. Seeds smooth. Den of Mains, two miles north of Dundee. Naturalized. (Mr. Lawson in "Phytologist," No. 90, p. 344.) A native of the south of Germany and Hungary. (Comp. Koch.) Perennial. July (?).

SECT. III.—Leaves stipulate.

14. **E. Peplis**, Linn. Purple Spurge. E. B. 2002, L. C. 261. Stems several, prostrate, spreading, about six inches high. Leaves opposite, petiolate, semi-cordate, entire, glabrous, *stipulate*, the whole herbage of a glaucous, purplish hue. Flowers *axillary*, glands round. Fruit and seeds large, smooth, deciduous when ripe. Sea-coasts, south of England. Annual. July, September.

A. 3, C. 7. Lat. 50°—53°. Alt. 0. T. 52°—49°.

II. **Mercurialis**, Linn. Mercury. Annual or perennial plants, with simple or branching stems. Leaves opposite, stalked, simple and undivided. Flowers diœcious, mostly aggregate. Perianth of both kinds of flowers three-parted. Male flowers with nine-twelve stamens. Female flowers with a round ovary. Two spreading styles, and two stigmas. Fruit two round carpels, united by the axis,

with a solitary globular seed in each. Distinguished from *Euphorbia* by its opposite stalked leaves, and green usually aggregate small flowers, and especially by its dicarpous fruit, and the absence of milky juice.

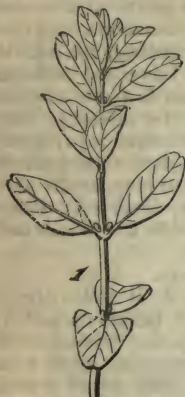


Fig. 139.—*Buxus sempervirens*. 1, a sprig of Box.

1. *M. perennis*, Linn. Perennial Mercury. E. B. 1872, L. C. 976. Root *perennial*, widely creeping. Stems erect, simple, slightly angular, leafy. Leaves opposite, petiolate, *ovate-oblong*, or *ovate-lanceolate*, not quite equal at the base, serrated, hairy on both sides, with minute triangular scarious stipules. Female flowers on long peduncles. Barren flowers in clusters on axillary peduncles. Fruit large, hairy. Seeds roundish, punctured-reticulate. Woods and shady places. Perennial. March—May.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—600 yards. T. 52°—41°.

2. *M. annua*, Linn. Annual Mercury. E. B. 559, L. C. 977. Root *annual*, branching, with numerous fleshy fibres. Stem erect, slightly angular, smooth, often branching at the base.

Leaves petiolate, ovate, or ovate-lanceolate, *cordate at the base*, with wide teeth, *shining*, with slight prominences on the upper surface; barren flowers in spiked clusters on furrowed peduncles. Rubbish and fields. Annual. July—October.

A. 10, C. 25. Lat. 50°—55°. Alt. 0—100 yards. T. 51°—47°.

M. ambigua, Linn. *fil.* E. B. 2816. Stem as in the type. Leaves linear-lanceolate or narrow and lanceolate, much more serrated than in the common form (the teeth are not so far apart). Fruit on longer pedicels than in *M. annua*. On rubbish near Parson's Green, Middlesex. Rare. July—October.

III. *Buxus*, Linn. Box. Shrubs or trees, with evergreen, entire, rigid, opposite leaves. Flowers monœcious, aggregate,

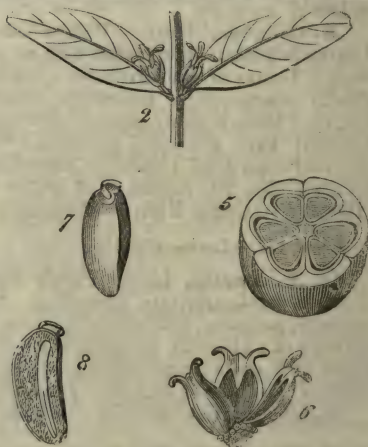


Fig. 139.—*Buxus sempervirens*. 2, portion of a sprig of Box, with female flowers on the axils; 5, transverse section of ripe fruit; 6, the same, opening with three valves; 7, a seed; 8, section of the same, showing the embryo in the centre.

axillary. Calyx three-parted, or of three sepals. Petals two, rather larger than the sepals. Stamens four, with two-lobed anthers. Female flowers on the same bud as the male. Calyx four-parted, or of four sepals. Petals three, larger than the sepals or segments of the calyx. Ovary roundish, with three lobes. Styles three, with obtuse, rough stigmas. Capsule three-celled (triccous), bursting elastically. Seeds two in each cell. (See Fig. 139.) The wood of these trees is hard, heavy, dense, and of a yellowish colour, and peculiarly valuable for wood-engraving. It is extensively used in the manufacture of mathematical instruments.

B. sempervirens, Linn. Box Tree. E. B. 1341, L. C. 975. A small, much-branched, tree, with four-angled young branches (angles occasioned by the decurrence of the petioles). Leaves ovate-oblong, on short petioles, leathery, entire, shining, evergreen. Flowers sessile in very compact, axillary clusters. Seeds triangular, oblong, black, shining. Tree. Flowers, April and May. Fruit, July, August. Box Hill, Dorking.

A. 3, C. 4. Lat. 51°—52°. Alt. 100—200 yards. T. 49°—47°.



Fig. 139.—*Buxus sempervirens*. 3, male flower magnified; 4, female flower magnified.

ORDER XLI.—URTICACEÆ, Juss. THE NETTLE FAMILY.

Trees, shrubs, or herbs. Leaves alternate, usually with asperities or stinging hairs, and membranous stipules. Flowers capitate, or in catkins, clustered or scattered, monœcious or diœcious. Perianth lobed, persistent, bearing the definite stamens. Anthers curved inwards in æstivation, bursting with elasticity. Ovary superior, simple, with a solitary ovule. Fruit an indehiscent nut, surrounded by the perianth, which is either membranous or fleshy. The British species are known chiefly by their rough leaves, often furnished with stinging hairs, or by their twining stems and inconspicuous flowers. The common hemp plant, the hop (Fig. 140), mulberry, bread-fruit, &c., are among the most important plants of the order. The true nettles are widely scattered over the globe, and many of them follow the footsteps of man in his migrations. The hemp tribe occurs in temperate regions, and the mulberry and bread-fruit genera chiefly in warm and tropical countries.

SUB-ORDER.—**URTICEÆ**. THE NETTLE TRIBE. Leaves entire or toothed; stamens and sepals four.

SYNOPSIS OF THE GENERA.

Urtica. Leaves toothed, furnished with stinging hairs; sepals of the female florets four, unequal.

Parietaria. Leaves entire or sinuated. Perianth tubular, inflated.

I. *Urtica*, Linn. Nettle. A large genus of herbaceous or shrubby plants, with upright stems and simple stipulate leaves. Flowers monœcious, variable, in the British species racemose or capitate. Perianth of the male flowers consisting of four equal, obtuse sepals. Stamens four, opposite to the sepals. Perianth of female flowers of four sepals, often two by abortion. Ovary ovate, with a downy, sessile stigma. Fruit an achénium, covered by the permanent perianth (sepals). These plants, *i. e.*, the British species, may generally be distinguished by their four-angled stems, their rough leaves, with stinging hairs, by their monœcious, clustered, or capitate inconspicuous flowers, and by their one-seeded fruit.

1. ***U. urens*, Linn.** Annual Stinging Nettle. E. B. 1236, L. C. 978. Root *annual*. Stem erect, ascending or spreading, branching usually from the base. Leaves roundish-ovate, slightly cordate or rounded at the base, deeply-toothed, almost incised; teeth (lobes) pointed, entire, or with small secondary teeth. *Clusters of flowers short, on very short peduncles, or sessile. Male flowers at the apex, and the female ones mostly at the base of the cluster.* On rubbish heaps and cultivated fields. Annual. May—October.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—42°.

2. ***U. dioica*, Linn.** Perennial Stinging Nettle. E. B. 1750, L. C. 979. Root *creeping, perennial*. Stems erect, rigid, quadrangular, with blunt angles, branching. Leaves ovate-acute, cordate at the base, deeply toothed, terminating in stinging hairs. Clusters axillary elongated, pendulous, slender, simple or compound. The male flowers are erect, and *are not in the same cluster as the females.* About walls, mostly, but not universally, near towns, villages, or houses. Perennial. June—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—800 yards. T. 52°—39°.

3. ***U. pilulifera*, Linn.** Roman Nettle. E. B. 148, L. C. 980. Root *biennial or perennial (?)*. Stems rigid, erect, branched, slightly tubercled or hairy. Leaves cordate at the base, ovate-acuminate, deeply toothed or *incised*. Flowers *monœcious*, the males in pairs in slender axillary clusters, the females in pairs in *globular, pedunculated, spreading, or drooping* hairy heads, in whorls, usually of four, and opposite to the males. Seeds (fruit) tubercled, ovate, flattened. About towns and villages in the east of England. Biennial (?). July. Very local.



Fig. 140.—1, *Urtica pilulifera*, portion of, natural size. 2, Male flower with stamens. 3, Female flower; *a*, ovary; *b*, stigma. 4, Fruit. 5, Section of fruit. 2, 3, 4, 5, magnified.

Note.—There are four clusters of florets from the same part of the

stem; two consist of barren and two are fertile flowers, on spreading and sometimes drooping stalks, which are slender and nearly an inch long.

U. Dodartii. Leaves nearly entire. Fruit less tubercled. Gathered at Wandsworth steam-boat pier, with other exotics. Biennial (?). June—October.

Alien. A. 9.

II. Parietaria, Linn. Wall Pellitory. Herbs, with leafy branching stems. Leaves alternate, entire. Flowers often monœcious axillary, aggregate or solitary, with an involucre. Perianth four-parted, enlarged and indurated in the perfect flowers, after flowering. Stamens four, elastic, with two-lobed anthers. Ovary ovate, with a cylindrical style and tufted stigma. Fruit an ovate, compressed achenium, invested by the enlarged perianth. This genus may be distinguished from the Nettle species by its minute, reddish flowers, by its leafy stems and branches, by its climbing habit, and especially by the absence of stinging hairs.

P. officinalis, Linn. *P. diffusa*. Common Pellitory. E. B. 879, L. C. 982. Stems usually numerous, spreading or erect, simple or branched, reddish. Leaves ovate, oblong, or lanceolate, tapering at both ends, hairy. Flowers in axillary, forked, roundish clusters, almost sessile, with an involucre shorter than the flowers. On old walls. Perennial. June.

Var. *β. longifolia*, Cose. and Germ. Stems more erect, not so much branched. Leaves oblong, larger and more tapering at both ends. Clusters of florets larger. This plant, in the size of its leaves and the largeness of its clusters of florets, appears to be intermediate between *P. officinalis*, Koch, and *P. erecta* of the same author.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

SUB-ORDER.—CANNABINEÆ. THE HEMP TRIBE. Leaves more or less divided or lobed; stamens and sepals five respectively. (See Fig. 141.)

I. Humulus, Linn. Hop. Stems herbaceous, several feet long, hollow, angular, prickly, leafy, twining. Leaves opposite, cordate, either undivided or three-lobed, very rough (scabrous). Flowers, diœcious. Perianth of male flowers five-parted or in five separate sepals, bearing five stamens. Female flowers in dense conical or globular catkins, composed of membranous one-flowered scales. Ovary small, oblong, with two styles, and spreading downy stigmas. Fruit a caryopse (?), attached to the base of the enlarged scale. The twining habit, rough stem and leaves, and the aromatic fertile catkins, sufficiently distinguish this genus, of which there is only one known species, the valuable Hop-plant.

H. Lupulus, Linn. Hop. E. B. 427, L. C. 983. Stems slender, rough, with short rigid hairs, long, twining. Leaves three-

five-lobed (palmate), cordate at the base; lobes ovate-acuminate, toothed or incised, rough, with resinous glands below. Male or barren flowers in a compound leafy panicle, subtended by cordate-ovate, acuminate, dentate, not lobed, floral leaves. Sepals five, lanceolate,



Fig. 141.—*Humulus Lupulus*. 1, A branch of the plant with the female flowers; 2, male flower; 3, cone of female flowers; 4, the same, with the scales refracted, to show the position of the flowers; 5, detached female flowers; 6, the pistil magnified; 7, ripe cone; 8, fruit (seed); 9, section of same, showing the incurved embryo.

with scarious narrow borders. Fertile spikes (cones), subtended by two bracts. Scales of catkin oval, reticulate. Hedges. Perennial. July, August.

A. 12, C. 50. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—47°.

II. *Cannabis*, Tourn. Hemp. Annual erect plants, with palmate leaves and axillary and terminal imperfect flowers. Sepals of male flowers equal. Stamens five. Female flowers each with a small bract. Calyx reduced to a single sepal, enveloping the ovary.

***C. sativa*, Linn.** Common Hemp. Stems often three-four yards high, angular, furrowed, rigid, leafy. Leaves palmate in three-seven divisions, the lower ones three-fid or five-fid, or ternate or quinate, the upper septinate. Segments lanceolate or linear, deeply and sharply

toothed; the uppermost leaves are often reduced to three segments, or have only the terminal one developed. Fruit (achenium) smooth, shut up in the calyx. Semi-naturalized, here and there on rubbish, manure heaps, and in similar places. Annual. June—September.

Note.—The seeds of this plant, like canary-seed, are commonly used for feeding cage-birds. Hence it is very generally found on rubbish heaps near towns, where these domestic pets are common.

ORDER XLII.—**ULMACEÆ**, Mirbel. THE ELM FAMILY.

Lofty trees, with stipulate leaves and caducous stipules. Flowers very small, in lateral sessile fascicles, perfect, appearing before the leaves.

Calyx campanulate or turbinate (see Fig. 144), with an erect five-, rarely four-eight-lobed limb. Stamens five, rarely four-eight, inserted in the base of the calyx. Ovary free, two-celled, with one ovule in each. Fruit (samara) compressed, surrounded by a broad membranous wing (Fig. 142, 4). Seed suspended.

Ulmus, Linn. Elm. Trees, with rugged bark and sometimes corky-barked branches. Leaves alternate, stalked, unequal at the base, generally serrated and rough, with stipules. Flowers in tufts, appearing before the leaves. Perianth single, of one piece, campanulate or turbinate, four-five-six-cleft, permanent and coloured on the inside. Stamens as many as the segments of the perianth, with opposite insertion. Anthers short, with four furrows. Ovary free, elliptic, oblong, compressed, with two styles and downy permanent stigmas. Fruit a one-celled samara with a notch at the apex. Seed solitary, often imperfect. Among the largest of British trees, and extremely common in fields, hedge-rows, homesteads and woods. The inner bark is viscid and tenacious, and hence is used in the manufacture of matting. They have the remarkable tendency of throwing up shoots from their roots, which extend to a great distance from the tree. They rarely produce perfect seeds, the tree having the property of reproducing itself by suckers.

1. **U. campestris**, Linn. Common Elm. E. B. 1886, var. *U. suberosa*, L. C. 986. Bark of the young shoots (recent branches) not corky. Leaves *ovate or roundish*, unequal at the base, mostly



Fig. 142.—1, *Ulmus*. 2, Flower; *p*, perianth; *st*, stamens and anthers. 3, Flower opened; *o*, ovary; *stig*, stigma. 4, Fruit. 5, Seed. 6, Ovary and styles.

doubly serrated (teeth with one or more secondary teeth). Flowers shortly pedicelled or nearly sessile. Fruit roundish or obovate, membranous, glabrous, whitish. The fruit in this country always falls off very early. Plantations, hedges, &c. March, April.

A. 11, C. 40. Lat. 50° — 56° . Alt. 0—200 yards. T. 51° — 47° .

2. *U. montana*, Sm. Broad-leaved Elm. E. B. 1887, L. C. 984. The leaves of this tree (Smith remarks) are large, *obovate*, with a long point, serrated, and *nearly equal at the base*, very scabrous above, downy and paler below. The large hop-like fruit is abundant in May or June, and the seeds are usually perfected.

Mr. Babington remarks:—"Probably all our Elms belong to two species (the above); *U. campestris*, which produces scions, and *U. montana*, which does not."

A. 18, C. 60. Lat. 50° — 59° . Alt. 0—350 yards. T. 51° — 44° .

U. suberosa, Ehrh. E. B. 2161. Leaves nearly round, acute, unequally cordate at the base, doubly serrated, branches with corky excrescences.

U. major, Sm. Leaves ovate, pointed, scabrous above, bark of young branches with corky excrescences.

U. carpinifolia, Lind. Leaves ovate, tapering, leathery, scabrous above and smooth beneath.

U. glabra, Mill. Leaves ovate-lanceolate, cuneate at the base.

U. stricta, Lind. Leaves obovate cuspidate, cuneate at the base.



Fig. 143.—*Ceratophyllum demersum*. 1, Portion of *Ceratophyllum demersum*. 2, Dichotomous pinna magnified. 3, Portion of stem; a, the male flower; b, the female flower. 4, Ripe fruit, natural size. 5, Transverse section of the fruit; a, exterior layer; b, interior layer; c, cotyledons; d, leaves. All much magnified.

ORDER XLIII.—**CERATOPHYLLACEÆ**, Gray. THE HORNWORT FAMILY.

Aquatic submersed plants, with verticilled two or three forked, linear or setaceous leaves. Male and female flowers distinct and axillary. Stamens ten-twentyfive on a common involucre, anthers sessile. Female flower consisting of a solitary ovary, one-celled and one-seeded, with a suspended ovule. Fruit coriaceous-indurated, one-seeded, not opening (indehiscent). Embryo oblong, with four cotyledons; plumule many-leaved; radicle very short.

Ceratophyllum, Linn. Hornwort.

Submersed, perennial aquatics, with slender, almost filiform, much-branched stems,

and whorled leaves which have more or less toothed segments; flowers incomplete, axillary, sessile, and solitary. Involucres, many-parted (ten-

twelve equal divisions). Barren flowers bearing ten-twentyfive stamens. Fertile flowers bearing a solitary one-celled ovary, with a suspended ovule. Fruit coriaceous, indurated, one-celled, one-seeded, not opening, crowned by the persistent style. This genus is distinguished by its whorled and forked (dichotomous) linear leaves, axillary flowers, and hard, one-seeded fruit.

1. **C. demersum**, Linn. Common Hornwort. E. B. 947, L. C. 387. Stems submersed and swimming, branched, leafy. Leaves twice-forked, rarely once or twice trichotomous (three branches from one point), sometimes once-forked. Segments *filiform, strongly toothed*. Fruit black, ovate, *with two curved, reflexed spines at or near the base*, and terminated by the indurated, persistent style, *which is about as long as the fruit*. Rivers, ponds, ditches, &c. Perennial. July—September.

A. 12, C. 40. Lat. 50°—57°. Alt. 0—200 yards. T. 50°—47°.

2. **C. submersum**, Linn. Unarmed Hornwort. E. B. 679, L. C. 388. Stems as in *C. demersum*. Leaves once, twice, or thrice forked, rarely twice forked, with setaceous, *slightly denticulate* (little-toothed) segments, in more or less contiguous whorls. Fruit black, ovate, *without spines at the base*, terminated by the indurated style, *which is shorter than the fruit*. Ponds and ditches. Perennial. June—September. The plant grows in denser masses than *C. demersum*, and does not produce fruit so abundantly as the more common species. In this country fruit is rarely produced on either species. In a piece of water at the top of Eelbrook Meadow, Walham Green.

Note.—*Cyperus fuscus* still grows here. A single plant was collected on the 18th of August, 1856, and several plants on the 25th of July, 1857. In a pond near the centre of the coal-pits, Dudley.

A. (?), C. (?). Lat. 50°—56°. Alt. 0—100 yards. T. 51°—47°.

ORDER XLIV.—**POLYGONACEÆ**, Juss. THE BUCKWHEAT FAMILY.

Herbaceous, rarely somewhat shrubby plants. Stems often enlarged at the articulations. Leaves alternate, simple. Stipules united, so as to form a sheath (ocrea*) to the stem. Flowers small, greenish, or coloured, nearly sessile, or pedicelled, in tufts (apparent tufts) spikes or clusters. Calyx persistent, of three-six sepals in two rows; sepals free, or more or less united, the interior larger than the exterior. Stamens four-ten, inserted at the base of the calyx; anthers of the outer stamens introrse, of the inner extrorse. Ovary free, rarely united with the base of the calyx, with one cell and one

* This term is usually, nay universally (!), written *ochrea* (the thin, tubular, membranous, fringed or torn process which closely invests the stem of all (?) the plants in this order), as if it was derived from *oxpos*, yellow, or ochre-coloured. It is rather derived from *ocrea*, a boot or greave (*id quod crus tegit*), used by Varro, Virgil, and Livy in this sense. The term employed by Homer in the *Iliad*, to express this portion of Grecian armature, is derived from *κνημῖς*, and hence *εὐκνημίδες Ἀχαιοί*: the well-booted Greeks, or well-harnessed Grecians, *bene ocreati Achivi*.

ovule. Styles two-three, rarely four. Stigmas capitate, or many-cleft (tufted). Fruit (achenium, caryopse) one-celled, one-seeded, not opening, with a crustaceous brown or black pericarp, compressed-lenticular or triangular, usually covered by the calyx. Seeds erect,

same shape as the fruit. Albumen thick, farinaceous, or horny. Embryo straight, or more or less curved. Radicle directed to a point opposite to the hilum.

Note.—The *Polygonaceæ* are distinguished by their scarious stipules (*oereæ*), and by their crustaceous fruit enclosed by the calyx.

SYNOPSIS OF THE GENERA.

Polygonum. Sepals five, rarely three-four, persistent. Stamens five-eight. Stigmas capitate.

Fagopyrum. Sepals five, usually coloured, withering.

Rumex. Sepals six, the three inner larger than the outer, and increasing after flowering. Stamens six. Stigmas tufted.

Oxyria. Sepals four, the two inner larger than the two outer. Fruit winged.



Fig. 144.—*Rumex sanguineus*. 1, Flower magnified, showing the outer sepals, *ooo*; the inner sepals, *iii*; the stamens, *ssssss*; *a*, the fringed anthers. 2, Flower unexpanded, showing the outer and inner sepals and the stamens. 3, Style; *ov*, ovary. 4, Section of style. 5, Triangular nut, section of, showing the position of the embryo. 6, The four-parted perianth and membranously winged fruit of *Oxyria reniformis*.

I. *Polygonum*, Linn. in part. *Persicaria*, *Bistort*. Snake Weed. Knot-Grass. Annual or perennial, sometimes twining, usually herbaceous plants. Leaves revolute in prefoliation, simple and alternate. Flowers small, in spikes or in axillary terminal clusters, rarely solitary. Calyx usually of five, rarely of three-four sepals, cohering below, nearly equal, enlarging after flowering. Stamens five-eight, rarely four-nine, with alternate glands (these are not always present). Styles two-three, united below or entirely cohering to their summits, with capitate stigmas. Fruit triangular or lenticularly compressed (a convex, roundish, or elliptical seed, which has a thin margin, and is on the whole somewhat like a lens, is termed lenticular), and surrounded by the persistent calyx. Embryo curved; cotyledons usually linear. The plants of this genus may be distinguished from those of the other genera of this order by their five-cleft coloured perianth, and by their variable and usually more numerous stamens and styles.

SECT. I.—*Persicaria*. Plants not twining. Leaves ovate or oblong, lanceolate or linear. Flowers in clusters, or in terminal and lateral spikes; style two-three, united below or just at the base.

§ 1. Plants perennial. Stamens protruded far beyond the perianth.

1. **P. Bistorta**, Linn. Bistort. Snake-Weed. E. B. 509, L. C. 931. Root thick, woody, *twisted* (hence the name of the plant). Stems twelve-eighteen inches high, simple, erect. Sheaths (ocrea) mostly herbaceous, very long, the membranous portion not fringed. Leaves oblong or ovate, cordate or truncate at the base, slightly *decurrent* on the *petiole*, green above, glaucous beneath (on the under surface); the root-leaves are on long petioles; the uppermost are sessile or nearly sessile. Flowers in a compact oblong or cylindrical spike (they are not all sessile, and consequently the flowers are spiked or clustered). Styles united only at the base. Fruit smooth, shining, *triangular*, acuminate, with sharp angles, and concave sides. In moist meadows; not frequent. Perennial. June, July.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 50°—46°.

2. **P. amphibium**, Linn. Amphibious *Persicaria* or Bistort. E. B. 435, L. C. 933. Root long, *creeping, branching*. Stems either submersed and swimming, or terrestrial, much branched, rooting. Leaves petioled, oblong or lanceolate, rounded at the base, or slightly cordate, *limb not decurrent on the petiole*, pale green above. Flowers in compact spikes, solitary and terminal. Styles two. Fruit smooth, shining, ovate, compressed. Ponds, marshy damp places, and sometimes on very dry ground. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

Var. *α. natans*. Stem and leaves swimming, *the latter glabrous*. Spikes of flowers only above the water.

Var. *β. terrestre*. Stems erect. Leaves downy, sometimes wavy.

3. **P. viviparum**, Linn. Alpine Bistort. E. B. 669, L. C. 932. Root tuberous. Stems reclining at the base, slender, erect, leafy, *six-eighteen inches high*, with barren shoots at the base. Leaves of the barren shoots elliptical, those of the stem linear-lanceolate, with revolute margins, root-leaves elliptical, with wingless petioles, and with brown truncate or lacinated ocrea (sheaths). Spikes rather lax, the lower part bearing bulbs, the upper part bearing flowers. Flowers pedicelled, rosy. Stamens protruded. Fruit triangular, shining. Mountain pastures. Perennial. July.

A. 8, C. 20. Lat. 53°—61°. Alt. 0—1300 yards. T. 47°—34°.

Note.—Large specimens were collected by the river Dochart, near its influx into Loch Tay, Killin.

§ 2.—Plants, annual. Stamens not exerted (included).

4. **P. lapathifolium**, Linn. Pale-flowered *Persicaria*. E. B. 1382, L. C. 934. Stems erect or spreading-ascending, branching often from the base, often spotted or mottled, leafy. Leaves ovate-lanceolate or lanceolate, tapering at the base, petioled, glabrous or nearly so, sometimes downy or cottony beneath; sheaths with *short fringes*,

glabrous or downy (ocreae narrow not fringed). Flowers *pale or whitish green*, in erect, compact, oblong-cylindrical spikes. Peduncles glandular, rough. Perianth arcuate and incurved at the margins of the sepals. Calyx not glandular. Styles two, divergent. Fruit smooth, shining, roundish or ovate, compressed, *concave on both sides*. On rubbish, and in waste places. Annual. July—September.

A. 16, C. 75. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

5. **P. Persicaria**, Linn. Spotted Persicaria. E. B. 756, L. C. 935. Stems erect or ascending, spreading, branched from the base, smooth, slightly hollow. Leaves oblong-lanceolate or lanceolate and narrowed at the base, glabrous or nearly so, on short petioles; sheaths glabrous or slightly downy, with *long fringes*. Flowers *rosy*, in oblong-cylindrical spikes, either interrupted or compact, some part usually being very dense. Calyx without glands. Fruit smooth, shining, black. In gardens and moist places. Annual. July, August.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—450 yards. T. 52° — 42° .

Note.—The fruit of *P. Persicaria* is either ovate-compressed or ovate, *flat on one side and convex on the other*, or three-angled, *with all the sides concave*, always shining.

P. mite (?), Schrank. E. B. 2867, L. C. 936. Stems erect or spreading, branched from the base, glabrous, internodes tapering. Leaves oblong-lanceolate, lanceolate or lanceolate-linear, tapering at the base, on short petioles, *more or less rough*. Sheaths smooth, striated, with long fringes; herbage not in the least hot or acrid. Flowers *rosy*, in *slender*, interrupted, lax spikes. Calyx without glandular points. Fruit smooth, shining; some of the nuts roundish, compressed, with convex sides, others triangular, with slightly concave or flat sides. Taste of the plant not peppery-hot. Ditches and watery places. Annual. July, August.

Note.—Only a very slight variety of *P. Persicaria*.

P. laxum (?), R. E. B. 2822, L. C. 935 c. Stems erect or spreading, *stouter* than in *P. mite*, with shorter internodes, longer, ribbed, and with shorter fringed sheaths. Leaves rougher, with longer cilia* (fringes), lanceolate, much attenuated at both ends. Flowers *rosy*, in slender, interrupted or oblong, continuous, denser spikes; rach rather rough. Fruit roundish, with a small point, nearly flat on one side, and convex-ridged on the other, shining; without a pungent flavour. Ditches and watery places. Annual. July, August.

The following is a description of another form (?) of this protean species:—Stems round, puberulent, flexuous. Leaves lanceolate, tapering at the base, slightly glandular below. Ocreae toothed and lacerated, scarcely fringed, with prominent ridges. Peduncles and upper part of the stem scabrous, with glandular hairs. Spikes elongated and slender, or short and dense. Nut (fruit) smooth and shining, flat or rather concave on both its sides, much shorter than the perianth. Styles connected below, diverging and reflexed above. Rubbish near Parson's Green. Annual. July—October.

* *Cilia*, the plural of *cilium*, a hair; not *ciliae*, as it is usually written.

Note.—The peduncles are somewhat glandulous in most of the examples; also the nut is rather flattened or compressed on both sides, and it protrudes beyond the sepals.

6. **P. Hydropiper**, Linn. Biting Persicaria. E. B. 989, L. C. 937. Stems erect or ascending, slender, smooth, with swollen joints, branching. Leaves oblong-lanceolate or lanceolate, attenuated at the base, nearly sessile, glabrous or nearly so; sheaths glabrous, loose, striated, ciliated with long or short hairs. Flowers pale rose, or pale green, in very slender, long, filiform, lax, drooping, not continuous spikes. Sepals glandular. Fruit not shining. *The whole plant has a pungent flavour*. Ditches and moist places. Annual. July—October.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

7. **P. minus**, Huds. *P. mite*, Schrank. Compare Coss. and Germ. "Flore des Environs de Paris," p. 466, where these authors describe *P. minus*, Huds., as a var. of *P. mite*, Schrank. Small Persicaria. E. B. 1043, L. C. 938. Stem decumbent or ascending (more erect), kneed, branched, leafy, six-twelve inches high. Leaves linear-lanceolate, entire, flat; ocrea close, with long filiform fringes. Spike filiform, interrupted, nearly erect, lax. Flowers white. Nut ovate, convex on both sides, shining, slightly pitted (sometimes slightly flattened on one side, acuminate). The plant varies much in size, and is sometimes nearly erect. The above description includes the var. *β. erectum*, Babington. Marshy and wet gravelly places. Annual. August—October.

A. 12, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—48°.

In a wet meadow between Walham Green and Little Chelsea, with *Cyperus fuscus*, *Helosciadium repens*, *Trifolium fragiferum*, and other scarce plants. d/

SECT. II.—*Avicularia*. Plants not twining. Leaves lanceolate oblong, or linear-oblong. Flowers axillary, solitary, or few. Stigmas two, subsessile, roundish.

8. **P. aviculare**, Linn. Common Knot-Grass. E. B. 1252, L. C. 939. Roots perennial, very tough or woody. Stems numerous, rarely solitary, spreading, or even prostrate, branched, *the branches leafy to the summit*. Leaves oblong, lanceolate, or oblong-linear, nearly sessile, somewhat fleshy, glabrous, usually slightly glaucous. Sheaths (ocreae) scarious, laciniate, with long segments. Flowers nearly sessile, axillary, solitary, or in pairs or threes. Fruit bluntly triangular, with shining angles, slightly pitted (finely striated) on the sides, which are either flat or slightly concave. Roadsides, borders of fields, and rubbish; very common. Annual. July—October.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—450 yards. T. 52°—42°.

Sub-var. *latifolium*. Leaves much larger than in the typical form.

Var. *β. erectum*. Stems nearly solitary, erect.

A form of the variety *P. erectum* has the following characters:—E. B. 1252, L. C. 939. Stems slender, branched, ascending, or erect, nearly leafless, except near the base. Leaves (on the branches only)

not flat but somewhat induplicate, oblong, much attenuated below, on very short petioles. Sheaths torn, the upper scarious and fringed, or laciniated, or ragged. Outer sepals keeled. Fruit about twice as long as the calyx, triquetrous, smooth and shining. Chelsea, in a waste place in Upper Manor Street. Annual. October 30th.

9. **P. maritimum**, Linn. Sea Knot-Grass. E. B. 2804, L. C. 940. Stem woody at the base, and often with its lower part buried in the sand, round, furrowed, leafy. Leaves elliptical or ovate-tapering, on short stalks, with their margins folded close on the back of the leaf (not revolute in the usual sense of this term), ribs prominent below. Stipules (ocreae) long, lax, strongly ribbed and torn at the margin, *with branched nerves*, and long hair-like teeth. Flowers three together, all more or less pedicelled. Sepals with broadly scarious, spreading, broad margins. Fruit shining, *rather longer than the perianth*. South of England and Channel Islands. Perennial. July, August.

A. 1, C. 1. Lat. 50° — 51° . Alt. 0. T. 51° .

10. **P. Raii**, Bab. *P. Roberti*, Loisel (?), Hooker. L. C. 940*, E. B. 2805. Stems round, rough, with tubercled ridges, branched, prostrate. Leaves ovate-lanceolate, on short petioles, flat, with the margins slightly reflexed. Stipules (ocreae) toothed and fringed, *with simple nerves*. Flowers axillary in threes, white, with green keeled divisions. Fruit triquetrous, with concave sides, smooth and shining, longer than the perianth. Annual. September.

A. 10, C. (?). Lat. 50° — 61° . Alt. 0. T. 52° — 45° .

SECT. III.—*Tiniaria*. Plants twining. Leaves cordate-sagittate. Flowers in axillary tufts or clusters.

11. **P. Convolvulus**, Linn. Black Bindweed. E. B. 941, L. C. 941. Stems round, *angular-striated*, glabrous, twisted, climbing. Leaves petioled, cordate, with acute basal lobes, acuminate, glabrous, or nearly so. Sheaths short, truncate. Flowers white, in few-flowered tufts, or in lax, terminal, or axillary clusters. Calyx downy, granular; *outer sepals keeled, not membranous*. Fruit finely striated, triangular, with slightly concave sides, not shining. Fields and gardens. Annual. July.

A. 18, C. 81. Lat. 50° — 60° . Alt. 0—350 yards. T. 52° — 43° .

Note.—There is a winged variety of this species, which may be mistaken for the following.

12. **P. dumetorum**, Linn. Bushy Bindweed. E. B. 2811, L. C. 942. Stem angular, with slight depressions, leafy, slenderer and smoother than in *P. Convolvulus*. Leaves triangular-cordate, with truncate lobes, smooth and *limp*. Clusters of fruit contiguous, or nearly so. Segments of the perianth *winged, wings with a white membranous border, wrinkled*. Nut triangular, shining, but not quite smooth. Hedge, at Clent, Worcestershire. Annual. July—September.

A. 3, C. (?). Lat. 50° — 52° (?). Alt. 0—100 yards. T. 50° — 49° .

Note.—The plant described above may not be the true *P. dumetorum*, the fruit of which is described as *very smooth*, as well as shining.

II. *Fagopyrum*, Tournf. Buckwheat. Annual plants, with somewhat succulent stems, and small white or rose-coloured flowers, arranged in axillary or terminal groups. Perianth (calyx) usually coloured; sepals five, united at the base, withering. Stamens eight alternate, with eight glands. Styles three, with capitate stigmas. Fruit triangular, enclosed in the withered calyx. Albumen farinaceous; cotyledons large, leafy, folded and twisted, separating the albumen, and incompletely surrounding it.

***F. vulgare*, Nees.** *F. esculentum*, Moench. *Polygonum Fagopyrum*, Linn. Buckwheat or Brank. E. B. 1044. Stems erect, branching, more or less red and succulent. Leaves petioled, triangular, cordate-sagittate at the base. Flowers conspicuous, white or rosy, in short clusters on long peduncles. Fruit three-angled, smooth, with acute entire angles. Sometimes found wild about roadsides and in fields and woods, but generally cultivated either in extensive breadths for seed or in small patches in woods for game. Annual. July. Alien. (Compare "*Cybele*," vol. ii., p. 341.)

III. *Rumex*, Linn. Dock Sorrel. Herbs, rarely shrubs, more or less acid. Leaves oblong, wavy, rarely divided. Flowers in apparent axillary whorls. Perianth single, six sepals, the three inner and larger connivent and covering the fruit; the three outer more lax and spreading. Stamens six, short, erect, with oblong, erect, two-lobed anthers. Ovary triangular, with three spreading styles and large stigmas, which are multifid, forming fine tufts. Fruit triangular, sharp-edged, covered by the inner enlarged sepals. Distinguished from *Polygonum* by the six-parted green perianth, by the three styles with finely-tufted stigmas, by the acutely triangular fruit, and by the usually crisp or wavy leaves, as well as by the greater or less acidity of most of the species.

SECT. I.—Leaves usually rounded, abrupt or cordate at the base, never hastate nor sagittate (in Nos. 1 and 2, the leaves taper at the base); taste but slightly acid. Flowers perfect or polygamous. Styles free.

1. ***R. maritimus*, Linn.** Golden Dock. E. B. 725, L. C. 950. Root soft, with many fibres. Stems ~~smooth~~, erect, slightly reclining at the base, zigzag, furrowed, rough, green, simple, or with few branches. Leaves *attenuated into the petiole*, lanceolate-linear, entire, quite flat. Whorls many-flowered, *bracteate*, contiguous and spiked when ripe. Valves of the fruit all granular; grains oblong, teeth two or more, long, setaceous, outer sepals much shorter than the teeth of the valves. Ponds and wet places. Putney Heath, Battersea Fields, &c. Annual. July—September.

A. 12, C. 30. Lat. 50°—55° (58°). Alt. 0—100 yards. T. 51°—47°.

Note.—The enlarged sepals have each a prominent linear, elongate grain, and terminate in a long tapering point, with a *very long horizontal tooth on each side*. (The tooth is not universally present on both sides; it is sometimes deficient.)

2. ***R. palustris*, Sm.** Marsh Dock. E. B. 1932, L. C. 950 b.

Stems erect, rooting at the base, smooth below and finely striated, slightly furrowed and roughish above, with erect slender branches, reddish. Leaves attenuated towards the base, petioled, lanceolate or linear-lanceolate, entire or sinuate. Lower leaves cordate below, slightly crisp on long petioles; upper leaves tapering at the base. Whorls several- or many-flowered, bracteate in a leafy spike when mature. Valves of the fruit granulate, ovate-oblong, acuminate, *with two setaceous teeth on each side, teeth shorter than the valve*: outer sepals about as long as the teeth of the valves. Spike longer and slenderer than that of *R. maritimus*, fruit larger, stem smoother, and root (perennial). Ponds and marshy places. Perennial? July.

Estimated area, &c., the same as that of *R. maritimus*. ("Cybele," vol. ii., p. 346.)

3. *R. conglomeratus*, Murray. *R. acutus*, Sm. Clustered-fruited Dock. E. B. 724, L. C. 948*. Stems erect, angular, furrowed, reddish, hollow or partly filled with pith, much branched, branches more or less spreading. Leaves on short petioles, oblong-lanceolate, blunt or pointed at the top, rounded or cordate at the base, entire or finely crenulate; upper narrower and *the limb decurrent on the petiole and unequal*. The apparent verticils are bracteate, except the uppermost. Interior or fruit-bearing sepals *oblong-lanceolate, obtuse, each with a large ovate granule*, and almost entire at the base. Battersea Fields. Perennial. July.

A. 17, C. 75. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

4. *R. sanguineus*, Linn. *β. viridis*, Sm. E. B. 1533, L. C. 948. Stems erect, green, or reddish, angular, smooth, striated, with more or less erect branches. Leaves petioled, oblong, rounded or cordate at the base, entire or finely crenulate, slightly wavy; the upper narrower, on short petioles. Whorls *mostly leafless*. Valves of the fruit lanceolate-oblong, blunt, *entire, the outer one with a round granule*, the two others with only rudimentary granules or none. Woods and shady places. Perennial. July.

A. 16, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

Var. *β. sanguineus*. Stem and nerves blood-red. Rare. Dolgelly, North Wales.

5. *R. pulcher*, Linn. Fiddle Dock. E. B. 1567, L. C. 949. Erect, bushy plants. Stems flexuous, much branched; branches *divergent, divaricated*. Root-leaves in a rosette, oblong, cordate at the base, *contracted below the middle*, entire or sinuate, the upper leaves smaller, lanceolate, or oblong-lanceolate, more or less crisp (curled) at the margin. Whorls many-flowered, dense, all bracteate except the uppermost. Valves of the fruit strongly (prominently) *reticulate, wrinkled, with many stout subulate granulated teeth*. Waysides; at the base of walls; dry pastures. Perennial? Biennial? July.

A. 7, C. 30. Lat. 50°—54°. Alt. 0—100 yards. T. 52°—48°.

6. *R. obtusifolius*, Linn. Blunt-leaved Dock. E. B. 1999, L. C. 947. Roots fleshy or woody, with many lateral fibres. Stems angular, erect, rigid, hollow, furrowed, branching above, *branches*

erect. Lower leaves large, ovate or oblong on long petioles, cordate at the base, blunt, entire; upper leaves ovate-oblong or lanceolate, *attenuate and equal at the base*. *Most of the verticils without leaves, contiguous, confluent at the top*. Inner sepals *ovate-oblong or triangular*, the outer valve only granular, the two others with rudimentary granules. Fields and waste places. Perennial. July.

A. 18, C. 81. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

Var. *β. acutifolius*, *pratensis*, M. and K., E. B. 2757. Leaves pointed; one of the fruit-bearing sepals larger than the others, dilated and toothed at the base, with a small triangular point. Perennial. July. See *R. pratensis*.

Note.—The radical leaves by which it is said to be distinguished are not *all obtuse*. The enlarged sepals are toothed for half their length, and the teeth are about as long as in *R. palustris*. Waste grounds, moist, marshy places (?). (Rare ?). Perennial. July—September.

R. *pratensis*, M. and Koch. Meadow Dock. E. B. 2757, L. C. 945. Stem deeply furrowed, not shining, slightly rough, chiefly on the upper part, with rounded, prominent angles, zigzag, leafy. Lower leaves slightly cordate, ovate, elongate, not tapering, curled, and scarcely entire at the margin. Whorls mostly leafless, approximate. Valves of the fruit (enlarged sepals) dilated, all wrinkled with prominent reticulations and toothed at the base, entire towards the apex, *one only granular*, the other two with rudimentary granules or none. (See Var. *β. acutifolius*.) Marshy places; rare.

A. 10, C. (?). Lat. 50°—54°. Alt. 0—200 yards. T. 52°—48°.

7. **R. *crispus***, Linn. Curled Dock. E. B. 1998, L. C. 944. Stems furrowed, branching. Branches erect, usually short. Leaves petiolate, lanceolate, attenuated or truncate at the base, *with curled margins*; upper leaves narrow. Apparent verticils numerous, each with a bract, the lower with a leafy, the upper with a scarious withered one. Perianth with three outer rather open, narrow, somewhat pointed sepals, and three inner roundish or *ovate-roundish ones*, entire, rarely toothed at the base, the one with an ovate granule, the other two with rudimentary granules, rarely all granular. Roadsides and fields. Perennial. June—August.

A. 11, C. 82. Lat. 50°—61°. Alt. 500—150 yards. T. 52°—45°.

8. **R. *aquaticus***, Linn. (?) Water Dock. E. B. 2698, L. C. 944*. Stems smooth, furrowed. Lower leaves cordate at the base, petioled; upper leaves lanceolate, tapering at the base. Whorls crowded and leafless above. Valves of the fruit *roundish, wavy at the margin or entire, cordate at the base, membranous, strongly reticulated without tubercles*. Nut acutely angled, almost winged above, with concave sides, elliptical or oblong. Damp places; common in the middle and north of Scotland; rare in the north of England. Perennial. July.

A. 10, C. 40. Lat. 54°—61°. Alt. 0—500 yards. T. 47°—42°.

9. **R. *Hydrolapathum***, Huds. Great Water Dock. E. B. 2104, L. C. 943. Stems erect, robust, channelled, branching above. Root- and lower leaves very long, oblong-lanceolate on long petioles, tapering

at both ends and decurrent on the petiole, entire or finely crenate. Whorls many-flowered without bracteal leaves (for the most part). Valves of the fruit *scarious at the margin, nearly entire, all granular*. Perennial. June—August.

A. 13, C. 40. Lat. 50° — 56° . Alt. 0—200 yards. T. 52° — 48° .

Note.—This is the largest and finest of our native Docks. The leaves are very handsome, and are with their petioles usually about a yard long. On river sides not unfrequent.

10. **R. alpinus**, Linn. Monk's Rhubarb. E. B. 2694, L. C. 946. Stems glabrous, furrowed. Root-leaves large, *broadly cordate on long channelled stalks*; stem-leaves *cordate or ovate* acuminate, margins entire, wavy. Whorls of flowers crowded, the lower only leafy. Enlarged inner sepals cordate acuminate, blunt, slightly toothed, nerved, membranous, without tubercles at the base. Fruit elliptical, acute. Waysides and villages near Dollar, Scotland. Perennial. July—September. Alien.

SECT. II.—Flowers dioecious or polygamous. Styles united with the angles of the ovary. Leaves hastate or sagittate. Taste acid.

11. **R. acetosa**, Linn. Common Sorrel. E. B. 127 (?). L. C. 951. Stem erect, furrowed, branching above. Lower leaves on long petioles, *oblong or ovate, sagittate*, with parallel or converging lobes, the upper ones narrower, sessile, stem-clasping, often pointed. Flowers dioecious. Female flowers often partly barren. Outer sepals reflexed; inner membranous, roundish, very blunt, cordate, with a scale-like process covering the notch. Meadows and pastures. Perennial. June.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—1350 yards. T. 52° — 33° .

12. **R. Acetosella**, Linn. Sheep's Sorrel. E. B. 1674, L. C. 952. Stems erect or ascending, branching, slender, leafy. Leaves petiolate, ovate, *oblong-lanceolate or linear, hastate*, with divergent lobes. Flowers dioecious. Whorls without bracts, slightly distant, proximate when ripe. Valves of the fruit membranous, roundish, pointed, cordate at the base, entire, without granules; outer sepals closely applied to the valves of the fruit. Pastures; dry places. Perennial. June—September.

A. 18, C. 82. Lat. 50° — 60° . Alt. 0—1200 yards. T. 52° — 35° .

Var. *a. vulgaris*. Leaves ovate, oblong, or lanceolate. Sub-var. *fissus*. Lobes two-three cleft.

Var. *b. angustifolius*. Leaves linear-lanceolate or linear; auricles narrow, or one or none.

IV. **Oxyria**, Mountain Sorrel. Herb, perennial, smooth, acid. Leaves with radiating nerves. Inflorescence whorled. Perianth single, four-parted, the two outer spreading, the two inner erect, larger, all persistent. Stamens six. Ovary compressed, with membranous edges, cloven at the apex. Styles one from each lobe of the ovary. Stigmas in many fine tufted segments. Fruit compressed, with a broad, nearly round, membranous margin. Easily distinguished

from *Rumex* by the kidney-shaped leaves, the four-parted perianth, and the winged or membranous-edged fruit.

1. *O. reniformis*, Hook. Mountain Sorrel. E. B. 910, L. C. 953. Stem erect, eight-twelve inches high, usually leafless, sometimes with a leaf below the flowers. Leaves radical, rounded, crisp, cordate-reniform, with a long shallow scollop at the apex, on long stalks. Flowers in close, erect clusters, on short pedicels, which are enlarged at the base of the flower. Mountains in Wales, England, and Scotland. By a mountain-stream near Killin, not far above the level of Loch Tay. A. 7, C. 20. Lat. 52°—60°. Alt. 0—1300 yards. T. 47°—33°.

ORDER XLV.—CHENOPODIACEÆ. THE GOOSE-FOOT FAMILY.

Herbaceous or half-shrubby plants, either annual or perennial, with leafy stems (rarely jointed and leafless, as in *Salicornia*). Leaves entire, or sinuate or dentate, incised or cleft, rarely cylindrical and succulent. Flowers small, greenish or reddish, perfect or monœcious, or diœcious or polygamous. Sepals three-five, rarely more and rarely two, often fleshy and indurated after flowering. Stamens one-five, hypogynous (under the ovary) or on the calyx, opposite to the sepals. Filaments free, with two-lobed introrse anthers. Ovary free, rarely united with the calyx, with one cell and one ovule. Styles two, rarely three-five, united at the base. Fruit one-celled, one-seeded, not opening, enclosed in the calyx, which is often indurated. Pericarp membranous (utricle), rarely coriaceous, free, rarely attached to the seed. Seed horizontal or vertical, in a black or brown brittle shell. Embryo annular, rarely half-annular. Radicle approaching the hilum. (See Fig. 145.)

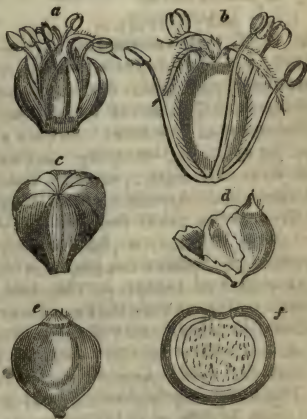


Fig. 145.—a, Entire flower of a *Chenopod*; b, the same, with the calyx detached; c, the fruit enclosed in the persistent calyx; d, the same, with the pericarp torn; e, fruit entire, without the calyx; f, section of the seed showing the half-annular embryo.

SYNOPSIS OF THE GENERA.

Chenopodium. Calyx herbaceous. Seeds for the most part horizontal depressed.

Beta. Calyx of the fruit woody-drupaceous; pericarp indurated, united with the calyx; seed with a membranous testa (shell).

Atriplex. Calyx of the female flower di-sepalous, compressed, enlarging when in fruit. Flowers polygamous or monœcious. Pericarp membranous, free.

Obione (*Halimus*). Pericarp ultimately adhering to the calyx-tube.

Schoberia. Leaves fleshy, cylindrical or half-cylindrical. Flowers perfect. Seed with a crustaceous testa.

Salsola. Seed with a membranous testa.

Salicornia. Seed vertical; in five and six seed horizontal.

I. *Chenopodium*, Linn. Goose-foot. Herbaceous, mostly annual plants, with alternate, usually lobed leaves, often unctuous or covered with a mealy or friable powdery substance. Perianth of one piece, in five deep, ovate, permanent segments, membranous at the margin. Stamens five, opposite to the segments, with two-lobed anthers. Ovary orbicular, with two short styles and obtuse stigmas. Fruit depressed, usually invested with the connivent sepals, with a very thin pericarp. Seeds with a testaceous episperm. These plants may in general be distinguished by their angular stems, lobed leaves, and clustered flowers.

SECT. I.—Seed horizontal.

§ 1. Leaves entire.

1. ***C. polyspermum*, Linn.** Round-leaved Goose-foot. E. B. 1480, L. C. 909. Stem diffuse, prostrate, or ascending, more or less branched and leafy, furrowed and shining. Leaves ovate, tapering at the base, pale green on both sides, quite entire, stalked (sessile).—*Babington*. Clusters of flowers small, axillary, and leafy, even those at the apex of the stem. Lobes of the perianth more or less thickened at the tips, clasping, but not quite covering the fruit. Fruit dark chocolate-brown, slightly tubercled, not shining. Waste places; not common. Annual. July—October.

This is the usual form of this plant, but we once gathered, in a garden at Hendon, a plant which was quite prostrate, with more rounded and pliant leaves, and in which the fruit was of a deep black colour and shining. We believe the latter to be *C. polyspermum* of Smith. It is so rare that we never saw this form a second time. The eminent author of the "English Flora" says that it is a Cornish plant.

A. 8, C. 30. Lat. 50°—54°. Alt. 0—200 yards. T. 52°—48°.

Sub-var. *acutifolium*. Leaves oblong-ovate, acute.

The following is the character of a variety of *C. polyspermum* from Battersea Fields, growing on mud, September 19, 1856 :—Stem prostrate, much branched. Leaves ovate, on long petioles. Clusters axillary and terminal; the axillary clusters leafless and cymose, the terminal ones leafy.

2. ***C. olidum*, Curt.** *C. vulvaria*, Linn. Stinking Goose-foot. E. B. 1034, L. C. 908. Stems branched, diffuse, prostrate, slender. Leaves *ovate-rhomboid*, petioled, very entire, with whitish, ashy, powdery granules on both sides. Clusters axillary and terminal, usually contiguous at the tops of the branches. Sepals of the fruit not keeled, enveloping the fruit. Seeds shining, finely punctate. Plant very fetid, giving out when crushed the smell of putrid fish. Foot of walls, and on rubbish about towns and villages. Annual. July.

A. 9, C. 30. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—48°.

Note.—This plant, though it has a higher provincial area and a greater horizontal range, is a scarcer plant than *C. polyspermum*. More individuals of the latter are to be seen than of the former.—A. I.

§ 2. Leaves toothed or lobed.

3. *C. album*, Linn. White Goose-foot. E. B. 1723, L. C. 914. All the varieties of this very variable species have on the recent or newly-developed portions a *silvery unctuous* (*pubescence*) *efflorescence*, which appears on the more aged portions as scaly or chaffy processes. Stems erect, more or less branched. Leaves *rhomboid-ovate, entire or toothed and sinuate*. Clusters branched, nearly *leafless*. Smith says seeds not dotted, and Babington says smooth. We are not able to confirm these statements. These authors may be right, but if so, the skin of the seed (fruit) does not afford a distinctive mark. Fields and waste ground. Annual. July—September.

A. 18, C. 82. Lat. 50°–61°. Alt. 0–150 yards. T. 52°–45°.

This, with its numerous varieties or forms, is the most common or abundant of all the species.

Var. *β. viride*. Stem erect, angular, furrowed, branched, with prominent purplish angles, variegated with whitish and green lines or stripes. Leaves narrow, oblong, *much tapering at the base, many entire*, but some toothed and sinuate; upper leaves linear-lanceolate on long stalks, entire. Clusters roundish, branched, axillary drooping in a long hanging panicle; all leafless, except a solitary leaf at the base of the lower branches. (The uppermost clusters are leafless.) Angles of the perianth prominent, covering the fruit. Fruit slightly reticulate or punctate. This variety is beautifully frosted with shining granules.

Var. *γ. lanceolatum*. *C. lanceolatum*, Willd. Leaves ovate or lanceolate, all entire; clusters distant.

4. *C. ficifolium*, Sm. Fig-leaved Goose-foot. E. B. 1724, L. C. 915. Stems round, glabrous, with green ridges, somewhat red below, and in the axils of the branches. Branches spreading, or slightly erect. Leaves all petiolate, tapering at the base, three-lobed; lateral lobes short, entire, *central lobe elongated, oblong, toothed, blunt*; upper leaves oblong, narrow, entire, or scarcely lobed (toothed), smooth above, papillose, hoary below. Flowers in nearly leafless, erect clusters. Sepals keeled, hooded. Seeds horizontal, punctate, shining, hollowed, not keeled at the margin. Waste ground near Kensington, Battersea, &c. Annual. July.

A. 8, C. 15. Lat. 50°–56°. Alt. 0–200 yards. T. 51°–47°.

5. *C. urbicum*, Linn. Erect Goose-foot. E. B. 717, L. C. 910. Stem usually erect and branching from the base. Leaves *triangular, often tapering towards the base, pointed or taper-pointed, with deep pointed teeth*, bright green, whitish below. Heads in axillary and terminal *filiform* clusters, simple or branching, leafless; the upper contiguous. Sepals of the fruit *not keeled*, conniving, closely enveloping the fruit. Seeds not shining, finely punctate, with an elevated border. At the foot of walls, heaps of rubbish, &c. Annual. July—September.

C. rubrum has blunter teeth and denser, larger, and more leafy clusters than the above.

Var. *β. intermedium*. Leaves with large sharp teeth. Towns and villages. Annual. August.

A. 9, C. 30. Lat. 50° — 56° . Alt. 0—200 yards. T. 51° — 47° .

Less frequent than *C. ficifolium*.—A. I.

6. *C. murale*, Linn. Nettle-leaved Goose-foot. E. B. 1722, L. C. 912. Stems ascending or erect, spreading, branched, smooth, shining, mealy or granular at the top. Leaves *thick, shining, rhomboid, tapering and entire at the base*, deeply sinuate and sharply toothed, *upper leaves similar to the lower, and equally toothed*. Clusters mostly leafless, in a corymbose panicle. Sepals slightly keeled, connivent, enveloping the fruit. Fruit horizontal, *black* when ripe, *punctate*, with a sharp border. On rubbish, near towns and villages. Annual. August, September.

A. 12, C. 40. Lat. 50° — 56° . Alt. 0—200 yards. T. 52° — 48° .

7. *C. hybridum*, Linn. Maple-leaved Goose-foot. E. B. 1919, L. C. 913. Stem erect, branched, and spreading. *Leaves angular or toothed, cordate-triangular, abruptly tapering, not rounded at the base*. Clusters small, aggregate, leafless. Seeds large, dotted, or pitted. Waste places and fields. Rare. Not very scarce, about Chelsea, Battersea, &c., where it occurs in gardens and in waste places. Annual. August, September.

A. 5, C. 15. Lat. 50° — 53° . Alt. 0—100 yards. T. 50° — 48° .

SECT. II.—Seeds erect.

8. *C. rubrum*, Linn. Red Goose-foot. E. B. 1721, L. C. 911. Stem erect or ascending, round, smooth and shining, with green and pale-white stripes, with nearly horizontal branches, leafy. Leaves triangular rhomboid, more or less tapering at the base, lobed, the lower lobes elongated, with wide *sinuses*; the surface quite smooth and shining, reddish below, especially near the margin, fleshy, on long petioles. Clusters axillary and terminal, erect, in simple or branching leafy spikes; the floral leaves small, toothed or entire. Sepals connivent, green or reddish, herbaceous, barely enveloping the fruit. Seeds erect, very small, numerous, shining, finely punctate, *with an obtuse border, or with scarcely any border*. Rubbish near towns and villages. Annual. July—September.

A. 15, C. 60. Lat. 50° — 56° . Alt. 0—200 yards. T. 52° — 47° .

Var. *α. spicatum*. Stems very robust. Leaves deeply sinuated, clusters contiguous, spike-like, leafy. There are many forms of this variable species, viz. *crassifolium*, *spathulatum*, &c.

A singular variety of *C. rubrum* (?) has been observed since 1854 at Battersea and Chelsea. The principal branches are furnished with a great many very slender erect branches, and these secondary branches are leafy, and bear small, erect, leafy spikes of fruit. The leaves, though much reduced, preserve the same characters as in the common form.

9. *C. botryodes*, Sm. E. B. 2247, L. C. 911*. Stems spreading, prostrate, branched and leafy, four-six inches long. Leaves fleshy,

triangular or hastate, slightly toothed or lobed at the base. Clusters or spikes nearly simple, leafless (compound, dense, leafy in some examples). Seeds small (very minute), vertical, black, shining, in loose pericarps. Moist sandy places near the sea, Norfolk and Cornwall. Annual. September.

A. 4, C. 6. Lat. 50° — 53° . Alt. 0—50 yards. T. 52° — 49° .

10. **C. Bonus Henricus**, Linn. Good King Henry. E. B. 1033, L. C. 917. Root thick. Stems erect, angular, simple, or branching, smooth, downy, glandular above. Leaves slightly powdery, *triangular hastate, with acute lobes at the base*, entire, or almost so, pointed. Heads in panicle or simple clusters, spiked and leafless at the top. Calyx enclosing the fruit. Stigmas elongated. Seeds finely punctate, with a blunt margin. Near farm-yards, villages, &c. It was observed on the very summit of the Clent Hills.—A. I.

A. 17, C. 70. Lat. 50° — 58° . Alt. 0—200 yards (300 yards, the Clent Hills are nearly 1000 feet high).

SECT. III.—Seeds vertical or horizontal.

11. **C. glaucum**, Linn. Oak-leaved Goose-foot. E. B. 1454, L. C. 916. Stem usually branching from the base, reclining or ascending, diffuse. Leaves oblong, *blunt, thick, lazily toothed, or sinuate or angular*, tapering into the petiole, green on the upper surface, *glaucous, whitish, and densely powdery beneath*. Heads of flowers in simple clusters, axillary and terminal, compact, shorter than the leaves, erect. Sepals of the fruit not keeled, connivent, enveloping the fruit. Seeds, some vertical, some horizontal, smooth, with a sharp margin. Waste ground and rubbish near towns and villages; rare. The rarest *Chenopod*, if individuals be counted. Battersea Fields, on hardened mud.—A. I. Near Walthamstow.—Mr. Wm. Pamplin. Annual. July—September.

A. 4, C. 8. Lat. 50° — 56° . Alt. 0—100 yards. T. 50° — 48° .

C. opulifolium, Schrad. Viburnum-leaved Goose-foot. "Sturm Flora," 17, 75. Stem erect, angular, striated with white or green stripes. Leaves *rhomboid or rhomboid-ovate*, lobed or toothed unequally, deep green on the upper surface, frosted and powdery or granular underneath, the upper of the same shape as the lower. Clusters small, very hoary, contiguous. Sepals keeled, closely enveloping the fruit. Seeds shining, with an obtuse border. On rubbish at Wandsworth and Battersea. Annual. July—October. I have seen more examples of this than of *C. glaucum*. The latter had the fortune to have been observed earlier than *C. opulifolium*; hence its British nativity is unchallenged.—A. I.

Note.—*Chenopodium Botrys* comes up every year spontaneously (as I was told when the plant was shown me) in the gardens of Lord Lyttleton, Hagley, Worcestershire.

Blitum virgatum, Linn. Stem simple, slender, erect, leafy. Leaves linear, with acute lobes on short stalks. Clusters small, sessile, axillary. Fruit vertical, twice as long as the calyx, flat, with a broad border. Wandsworth, near steam-boat pier, September 15th, 1857. Only a few stragglers appeared during the present and former season.

II. Beta, Linn. Beet. Smooth, somewhat succulent, branching plants, with fleshy roots. Flowers axillary, aggregate. Perianth in five deep, obtuse segments, fleshy at the base, permanent. Stamens five, opposite the segments, bearing roundish two-lobed anthers. Ovary immersed in the base of the perianth, orbicular, with two, sometimes three, styles, and acute simple stigmas. Fruit embedded in the fleshy base of the perianth covered by the segments. The fleshy roots and bright shining leaves will generally be sufficient to characterize this genus.

B. maritima, Linn. Sea-Beet. E. B. 885, L. C. 925. Roots fleshy, black without, white within. Stems prostrate or ascending, angular, furrowed, branched, leafy, smooth, or slightly downy, often reddish. Leaves somewhat succulent, ovate, wavy at the edges; root-leaves large, stem-leaves much smaller. Flowers axillary, in pairs, arranged in long, slender, leafy spikes. Sepals linear, fleshy, keeled, with incurved tips. Stamens arising from a fleshy disk, which surrounds the base of the ovary. Fruit depressed, punctate. On muddy ditch banks near the sea. Perennial. August. A. 15, C. 30. Lat. 50°—61°. Alt. 0. T. 52°—45°.

III. Atriplex, Linn. Orache. Herbaceous or shrubby annual or perennial plants, with branching, mostly erect, stems. Leaves simple, undivided, lobed, or jagged, often covered with a mealy or granular substance. Flowers, both barren and fertile on the same and on different plants, axillary or terminal, aggregate, in tufted spikes or panicles. Perianth in five deep, ovate segments, permanent. Stamens five, opposite to the segments. Ovary orbicular, often imperfect, with a short cleft style and two stigmas. In the British species seed is rare in any of these flowers. Fertile flowers two, sepals of the perfect flowers two, persistent, and covering the fruit. Stamens none. Ovary compressed, with a bifid style. Fruit utricular, with one blackish or brown seed. This genus is very similar in habit, organization, and duration to *Chenopodium*. It is distinguished from that genus by its polygamous, monœcious or diœcious flowers (see Index and Glossary); also by the *two large sepals* of the usually fertile flowers, and by its generally more rigid habit.

1. **A. littoralis**, Linn. Grass-leaved Sea Orache. E. B. 708, L. C. 924. Stem erect, branching, angular, ridged, smooth, or more or less covered with a frost-like efflorescence; branches alternate, erect, leafy. Leaves all *linear*, bluntly pointed, *quite entire*, sessile, with a hoary mealiness beneath, slightly tapering at the base. Clusters dense, in erect, interrupted spikes, the lowermost leafy, the upper contiguous, leafless. Sepals of the fruit rhomboid-deltoid, tapering at both ends, toothed at the margin, and tubercled at the back, slightly open. Fruit roundish-ovate, compressed, hoary, and slightly punctate. Sea-coast. Annual. August, September.

A. 12, C. 30. Lat. 50°—58°. Alt. 0. T. 51°—48°.

2. **A. marina**, Linn. Sage-green Sea Orache. Stems diffuse,

branches spreading (rather more bushy than the preceding). Leaves *oblong-lanceolate*, or *linear-lanceolate*, usually with one or two *teeth near the base* (very often toothed from the base to the summit). Clusters round, in leafy or leafless spikes. Sepals of the fruit very unequal, rhomboid, acutely quadrangular, with or without marginal teeth, or ovate-lanceolate, very large, leaf-like, blunt at the tips, and with one or two teeth at the base, *without dorsal tubercles* (this is not always the case). Fruit roundish, compressed, with a granulated margin, and crowned with the persistent style. Sea-coast. Annual. August, September.

Area and range as in No. 1, from which some good botanists think it is not distinct.

There are but slight distinctions between these two plants. Though they are distinguishable, both while growing and in the herbarium, it is not easy to convey to unpractised observers their peculiar characteristics.

Note.—*A. marina* sometimes grows inland, at a considerable distance from the sea, and in such situations it assumes very variable forms, especially in the breadth of the leaves, and in their numerous long teeth. In such places it approaches, in appearance, some states of *A. patula*.

3. ***A. patula***, Linn. Spreading Orache. E. B. 936, L. C. 922. Stems erect or spreading, rigid, glabrous, striated, slightly angular. Leaves *triangular, hastate, with spreading lobes*, toothed, sinuate, pointed, smooth, shining, all petioled; upper leaves (bracts) linear-lanceolate, entire. Sepals of the fruit *triangular*, very slightly toothed at the margin, *mostly with large dorsal tubercles*, spikes compound or simple, lax or interrupted. Fruit covered with mealy grains, dark purple, opaque, slightly rough. Cultivated and waste ground. Annual. July—October.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

Var. *A. patula*. Stem prostrate, with ascending or nearly horizontal branches. Leaves triangular, hastate, with small triangular spreading lobes, margin nearly entire. Spikes interrupted, leafy. Calyx of the fruit cordate-ovate, entire, *not tubercled*. Seeds small, rough. Southend, Essex.

4. ***A. angustifolia***, Sm. Narrow-leaved Orache. E. B. 1774, L. C. 923. *A. hastata*, Sm. Stems erect or prostrate, spreading, smooth, angular, furrowed, with nearly rectangular branches. Leaves *lanceolate, entire*, the lower ones occasionally with two ascending lobes, base wedge-shaped, not horizontally truncate like *A. patula*, never toothed. Sepals of the fruit *slightly hastate* triangular, with sharp points, and occasionally toothed at the margin and tubercled on the back. Seeds (fruit) opaque, granular, as in *A. patula*. Cultivated and waste ground. Annual. July—October.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

A very common form of *A. patula*, from which it differs in its entire narrow hastate leaves.

A. microsperma? Stem erect or ascending, ridged and furrowed,

quite smooth, with spreading branches. Leaves mostly hastate, with ascending basal lobes, lower leaves often two-lobed, especially on one side, tapering at the base, ovate-lanceolate, acuminate, fleshy, shining and glaucous. Clusters small, leafy. Perianth toothed at the base, lanceolate or triangular-lanceolate. Fruit *very small*. Battersea, on soil spread over waste ground, near Albert Tavern. With an exotic *Amaranth* (*A. retroflexus*), October 15, 1853.—A. I.

5. ***A. deltoidea***, Bab. Delta-like-leaved Orache. E. B. 2860, L. C. 922 b., *A. hastata*, *deltoidea*. Stems erect or procumbent, branched. Branches erect or ascending; both stems and branches smooth, shining, striated. Leaves all petioled, mostly opposite, *hastate*, *triangular*, lobes *spreading or descending*, margin toothed, sinuate or entire. Fruit-bearing sepals triangular, toothed at the base and muricated at the back, longer than the fruit. Seed flat, smooth, shining. Rubbish. Chelsea College. Annual. September. (Compare "Cybele," vol. ii., p. 327.) Sub. *A. erecta*, Huds.

This has the area, range, &c., of *A. hastata*, under which it is placed. (See No. 3.)

It is probable that Nos. 3, 4, and 5, together with *microsperma*, *appendiculata*, &c., or in a word all the inland *Atriplices* make up *one* species. Nos. 1 and 2 are only slight varieties of each other. Nos. 6 and 7 are not separated by very prominent distinctive marks.

6. ***A. rosea***, Linn. (?) Roseate Orache. E. B. 2880, L. C. 921. Stems erect or ascending, smooth, branching. Leaves triangular-ovate, entire at the base, *green above, hoary beneath*. Unequally toothed and sinuate; upper leaves ovate, nearly entire. Sepals of the fruit rhomboidal-acute, toothed at the margins, tubercled on the back, with prominent nerves, clusters axillary and terminal, few-flowered. Seeds *shining, minutely tubercular, or almost smooth*. *A. crassifolia* (?). By the sea-shore. Annual. June—September.

A. 17, C. 50. Lat. 50°—61°. Alt. 0. T. 52°—45°.

Note.—The inland form collected at Wandsworth differs from the above described Isle of Wight plant, in the round smooth hard stem and in the more toothed leaves.

7. ***A. laciniata***, Linn. Cut-leaved Orache. E. B. 165, L. C. 920. *A. arenaria*, Woods. Stem procumbent and spreading, or erect and branched, often reddish. Leaves ovate or triangular toothed, on *short leaf-stalks*, hoary or mealy on *both sides*. Barren flowers in dense naked spikes; fertile flowers mostly solitary and axillary, with a very large woolly three-lobed perianth. Calyx of the fruit close, fleshy, and indurated within, three-lobed, the lateral sepals or lobes truncate, the central one pointed. Fruit (seed) large, *opaque, rough*. Sea-shores, Isle of Wight, Southend and Mersea (?), &c. Essex. Annual. July—September.

A. 16, C. 40. Lat. 50°—60°. Alt. 0. T. 52°—46°.

Note.—Mr. J. Woods told me that the under-described form is different from the above-described, and named by British botanists. The former has occurred at Wandsworth, and it is certainly exotic.—A. I.

A. laciniata vera. Not Smith's (*nec Smithii*) teste Joseph Woods, F.L.S. This form has an ascending, branching, smooth, polished, and somewhat woody, leafy stem. Leaves white on both sides, triangular, with numerous pointed, unequal lobes, tapering and entire at the base, on stalks, which are about half as long as the leaves. Clusters of barren flowers in short, slender, cylindrical spikes, leafless. This species grew for several years in the open space so often referred to adjoining the steam-boat pier, Wandsworth. It is annual, and flowers from August to October.

Notwithstanding the high authority above-named, I think that the locality may cause the great difference in the aspect of the plants. I have never seen fruit on any of the Wandsworth specimens.—A. I. *A. rosea* and *A. laciniata* are not distinguished by very prominent and constant characters.

IV. Obione, Gaert. (*Halimus*, Waller; *Atriplex portulacoides*, Sm.) Perianth connected, three-toothed. Stigmas two. Pericarp thin, adhering to the perianth. Seed (fruit) vertical.

1. **O. portulacoides**, Waller. E. B. 261, L. C. 918 (*A. portul.*) Stem woody. Leaves obovate, lanceolate, attenuated below. Perianth inversely triangular, shortly stalked, three-lobed and mucronate. Near the sea and on the shore. Perennial. July—October.

A. 12, C. 25. Lat. 50°—56°. Alt. 0. T. 52°—48°.

2. **O. pedunculata**, Waller. E. B. 232, L. C. 919. (*A. pedunculata*.) Stem herbaceous. Leaves obovate. Fruit on a long stalk, enlarged, inversely wedge-shaped, compressed, with two lobes enclosing an orbicular seed. On the shore of the Isle of Grain, several miles below Gravesend. Very rare. Annual. August, September.

A. 3, C. 5. Lat. 50°—54°. Alt. 0. T. 51°—49°.

V. Schoberia, Mey. Partly herbaceous, partly shrubby maritime plants. Leaves fleshy, half-cylindrical. Perianth five-parted. The habitat, fleshy leaves, and exalbuminous seeds are the distinguishing marks of this genus. In other respects it agrees with *Chenopodium*.

1. **S. maritima**, *Chenopodium*, Sm. Sea Goose-foot. E. B. 633, L. C. 927. Stem herbaceous, erect, or procumbent, much branched, rigid and dry at the base, succulent above, leafy. Leaves fleshy, semi-cylindrical (flat on one side and convex on the other), narrow, bluntly pointed. Valves of the calyx fleshy, convex, scarcely covering the fruit. Fruit (seed) bluntly pointed, with a flattish base, slightly reticulate and shining. Sea-shore. Annual. August.

A. 18, C. 50. Lat. 50°—61°. Alt. 0. T. 52°—45°.

2. **S. fruticosa**, Mey. Shrubby Saltwort. E. B. 635, L. C. 928. Stem erect, shrubby, a yard high, with numerous leafy branches. Leaves obtuse, semi-cylindrical, fleshy, glaucous, persistent. Styles three. Seeds black and shining. South and East Coasts; rare. Perennial. July, August.

A. 5, C. 8. Lat. 50°—53°. Alt. 0. T. 52°—49°.

VI. *Salsola*, Linn. Saltwort. Annual or perennial herbaceous plants, rarely suffruticose. Stems rigid. Leaves simple, narrow, sometimes spinous. Flowers sessile, axillary, solitary or aggregate. Perianth in five deep, rounded, permanent segments. Stamens five, opposite to the segments. Anthers roundish, two-lobed. Ovary globose, with two or three styles united at the base, stigmas recurved. Fruit, a utricle, embedded in the fleshy base of the perianth, one-celled and crustaceous. These plants may be distinguished partly by their habitats—sea-shores, salt marshes, and similar places—and partly by their narrow or cylindric fleshy leaves.

S. *Kali*, Linn. Prickly Saltwort. E. B. 634, L. C. 926. Stems spreading, angular, slightly rough branched, red at the axils. Branches spreading, leafy, rougher than the stem. Leaves fleshy, subulate, tapering, spinous, more or less rough. Flowers axillary, solitary. Fruit flattish, crowned with the styles. Seeds shining, finely punctate. On sandy sea-shores. Annual. July.

A. 15, C. 40. Lat. 50°—58°. Alt. 0. T. 52°—47°.

VII. *Salicornia*, Linn. Jointed Glasswort. Stem succulent, jointed, branched. Flowers in jointed, terminal spikes. Perianth succulent, tumid, obscurely lobed, persistent. Stamens one or two. Ovary ovate. Style short and thick, with a two or three cleft stigma. Fruit utricular, one-seeded, embedded in the perianth. These plants are distinguished by their smooth-jointed, fleshy stems, their inconspicuous spicate flowers, and by their maritime habitats.

1. *S. herbacea*, Linn. Jointed Glasswort. E. B. 415, L. C. 929. Stems and branches *erect*, both composed of a series of cylindrical joints, the uppermost producing two or three small sessile florets, with one stamen and two or three stigmas. On muddy sea-shores. Annual. July—September.

A. 18, C. 50. Lat. 50°—61°. Alt. 0. T. 52°—45°.

2. *S. radicans*, Sm. Creeping Glasswort. E. B. 2467, L. C. 930. Stem somewhat woody below, round, much branched; branches partly woody, succulent upwards; joints shorter than in *S. herbacea*, deeply notched, cylindrical (not thickened above). Spikes oblong, obtuse (?). Flowers in a triangle (?). On muddy sea-shores; Isle of Sheppy. Perennial. August, September.

A. 4, C. 6. Lat. 50°—54°. Alt. 0. T. 51°—49°.

The following is an abstract of a paper by J. Woods, Esq., F.L.S., on the various forms of *Salicornia*. It was read before the Linnæan Society, January 21, 1851:—

Salicornia herbacea, is always erect till borne down by the weight of the fruit; the branches are spreading or ascending, green, glaucous, never reddish. Fruit cylindrical, two-three inches long, one-fifth of an inch thick.

S. procumbens, Sm., is more common, and is decumbent (with a bend at the top of the root); branches mostly unilateral (half cylindrical), frequently divaricate or recurved. When mature, the plant is red and the spikes are only about half an inch long.

S. ramosissima. Much longer than either of the preceding, erect, very much branched and bushy, green, but tinged with red on the spikes, which are about an inch long, lanceolate or tapering, not cylindrical, as in the two preceding.

S. pusilla smaller than *S. procumbens*, but erect, and with erect or sub-erect branches, colour yellowish green.

S. intermedia is between *S. pusilla* and *S. herbacea*.

S. radicans. This differs in its mode of growth from the preceding. The stem is hard and slightly woody, producing brachiate (spreading) branches a little above the crown of the root. In the preceding forms every branch ends in a spike of fruit. In this many are barren.

S. lignosa agrees with *S. radicans* in its diffuse habit, but differs in the firmer (more woody) structure of the lower part of the stem.

ORDER XLVI.—AMARANTHACEÆ, Juss. THE AMARANTH FAMILY.

Herbs or shrubs. Leaves simple, exstipulate (without stipules). Flowers spicate or capitate. Perianth in three-five pieces, scarious. Stamens five or ten. Ovary single, superior, one- or few-seeded. Fruit a membranous utricle. Seeds lentiform, pendulous, with a crustaceous *testa* and central albumen. The sole reputed British species of this order is a humble annual weed of rare occurrence. The *Globe Amaranth*, *Cockscomb*, *Prince's-feather*, and *Love-lies-a-bleeding*, all belonging to this order, have been long in esteem as favourite greenhouse and border flowers.

Amaranthus, Linn. Amaranth. Herbaceous annual plants, with simple, undivided, entire, petiolate, and alternate leaves. Flowers either spicate or capitate, copious, monœcious (in distant clusters, or in contiguous spike-like panicles). Sepals three-five, erect, lanceolate, coloured, and permanent. Stamens three-five, capillary, with oblong, two-lobed, versatile anthers. Ovary (in the fertile flowers only) ovate, with three or two styles and acute stigmas, which are downy on the upper side. Fruit one-celled, one-seeded, opening transversely. Distinguished from *Chenopodium* by the denser inflorescence, and usually coloured perianth.

1. **A. Blitum**, Linn. Blite. E. B. 2212, L. C. 907. Stems *prostrate* or ascending, branching from the base, succulent, brittle, angular, glabrous, glistening, furrowed or striated. Leaves on long petioles, ovate-rhomboid, blunt, or with a short point, tapering at the base, with prominent nerves, and slightly crenulate margins, deep green, *glabrous*. Lower clusters of florets on pedicels, distant, leafless, upper in a sort of leafy spike, more or less distant, all roundish and green. Bracts scarious, minute. Sepals three, lanceolate, scarious at the margin, somewhat granular. Stamens three. Fruit ovate-roundish, slightly triangular. Said to grow on dung-hills and waste places near towns. Naturalized (?). Annual. August, September.

2. **A. retroflexus**, Linn. Erect Amaranth. Rehb. Ic. 5, 4, 75.

Stem *erect, stout*, angular, grooved, branching, with *rough pubescence*, leafy. Leaves ovate, with an obtuse point, *pale-green*, on long petioles. Flowers in spike-like, compact, panicle clusters. Bracts linear subulate, twice as long as the calyx. Sepals five, oblong-lanceolate, obtuse or truncate, mucronate. Stamens five. On rubbish, about Battersea and Chelsea. Annual. July—September.

Both these species occur about Battersea and at Wandsworth, by the steam-boat pier; also near Little Chelsea and Walham Green; but the genuine exotic, *A. retroflexus*, is rather more frequent than the reputed British species.

ORDER XLVII.—**CALLITRICHACEÆ**, Leveille. THE WATER-STARWORT FAMILY.

Submersed or partly floating plants. Stems slender, branching; the length is regulated by the depth of the water where they grow. Leaves opposite, entire. Flowers axillary, solitary, sessile, perfect or of one kind by abortion. Perianth (involucre) two opposite bracts. Stamens one-two, with long filaments. Anthers reniform, one-lobed, opening by a curved fent (slit). Ovary free, consisting of four one-seeded cells. Styles two. Fruit capsular, membranous, or slightly fleshy, composed of four one-seeded indehiscent carpels, which separate when ripe. Seed suspended with a thin testa (shell). Albumen fleshy. Embryo cylindrical, with short cotyledons. Radicle towards the hilum.

Callitriche, Linn. Water-Starwort. Aquatic, small, floating plants, with strap-shaped, entire leaves, and very minute, axillary white flowers. Perianth (involucre) consisting of two opposite, equal bracts. Stamens one, rarely two. Ovary four-lobed, with two styles. Fruit four-celled, four-seeded, with a dilated margin, indehiscent. (See "Phytologist," vol. iv., p. 32.)

1. **C. verna**, Linn. Vernal Water-Starwort. E. B. 722, L. C. 388. Stems slender, branching, variable in length, rooting, submersed. Leaves obovate or oblong, narrowing towards the base, entire, or notched at the summit. Bracts slightly hooked above, bending over the ovary, much shorter than the stamens and styles. Fruit with a keeled, sometimes winged border. Annual or perennial. June—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—650 yards. T. 52°—40°.

Var. *β. obovata*. (*C. stagnalis*, Scop.) Leaves obovate, forming a dense rosette at the top of the stem.

Var. *γ. platycarpa*, Kutz. Fruit larger than in *C. verna*, with the styles closely reflexed over it. In the var. *obovata* the lobes of the fruit are divergent.

Var. *δ. pedunculata*. Flowers and fruit more or less stalked.

These all occur in running or standing water, or in marshy places, chiefly where the surface is broken, as on mud, mire, and the like.

2. **C. autumnalis**, Linn. Autumnal Water-Starwort. E. B.

2732, L. C. 386. Stems flat, much branched, leafy. Leaves all linear, elongate, truncate, or notched at the tips, all submerged. Fruit nearly sessile, with divergent, broadly winged lobes. Styles spreading. Loch of Drum, Aberdeenshire. Mr. J. T. Syme. Annual. June—October.

A. (?), C. (?). Lat. 53°—(?). Alt. (?). T. 48°—(?).

†† Ovary united with the perianth (calyx).

The orders XLVIII., XLIX., and L. have their ovary inferior or united with or adherent to the calyx. Their diagnostics are as follow:—

Order XLVIII. is known by its aquatic habitat, its erect stems, whorled leaves, and very inconspicuous flowers. *Santalaceæ* are represented in Britain by a humble herbaceous plant, *Thesium humifusum* (*linophyllum*), which has a prostrate habit, half-coloured perianth and inferior ovary, and is mostly confined to the downs of the south and east of England. *Aristolochiaceæ*, of which there are only two British species, have a more developed perianth than the foregoing orders; and the ovary is inferior, with many ovules.

Note.—There are several monochlamydeous genera and species (plants with a single perianth) in some dichlamydeous orders (plants with a double perianth), viz.:—The apetalous genus *Illecebrum*, order *Illecebraceæ*, contains herbaceous procumbent plants, with a pentasepalous indurated perianth, which covers the one-seeded capsule. The genera *Sagina* and *Cherleria*, nat. ord. *Caryophyllaceæ* are often apetalous. They are minute plants, with linear often subulate leaves. The sub-order *Sanguisorbeæ* is composed of monochlamydeous plants, which are known by their compound leaves, their four or eight cleft, persistent calyx, which encloses one-three achenia. *Agrimonia*, an apetalous genus, is distinguished by its pinnate leaves, bristly five-cleft calyx, and two indehiscent carpels. The British *Haloragææ*

Callitriche lamulata

C. vicina

C. platycarpa

Hampster Heath

May 24th 1862. W.B.

tube. Ovary one-celled, with a single suspended ovule. Fruit crowned by the calyx-rim, one-seeded, not opening, seed suspended. Embryo straight, cylindrical, radicle towards the hilum.

Hippuris, Linn.
hollow stems, whorled

Mare's-tail. Aquatic plants with simple, leaves, and axillary flowers. Perianth a minute rim crowning the ovary. Stamen one. Anther of two round lobes at first sessile, and embracing the style. Style one, with an acute simple stigma. Fruit one-celled, one-seeded, slightly fleshy, bony.

H. vulgaris, Linn. Mare's-tail. E. B. 763, L. C. 379. Rhizomes horizontal, spongy. Stems erect, quite simple, round, polished. Leaves linear, in contiguous whorls of eight-twelve, spreading or reflexed, with more or less sharp points. Fruit small, ovate-oblong, crowned by the base of the style. In lakes and ponds. Perennial. June.

A. 18, C. 70. Lat. 50°—61°. Alt. 0—200 yards. T. 50°—46°.

Sub-var. Nearly the whole plant submerged, barren leaves elongated, soft. In running water.

ORDER XLIX.—**SANTALACEÆ**. Br. THE SANDALWOOD FAMILY.

Trees, shrubs, or herbs. Leaves simple, alternate. Flowers spicate or solitary, rarely umbellate. Stamens four or five, opposite to the segments of the perianth, in which they are inserted. Ovary inferior, one-celled, with from one to four ovules. Style one, often with a lobed stigma. Fruit hard, one-seeded, sometimes drupaceous. The only British example of the order is an obscure, trailing, herbaceous plant. They are for the most part natives of Asia, America, and Australia.

Thesium, Linn. Bastard Toad-flax. Smooth, rigid herbs or shrubs, with scattered narrow leaves, and racemose or panicled, bracteated small flowers. Perianth funnel-shaped, four-five cleft, with spread-stamens four-five, with roundish anthers, and a small tuft of hairs at the base. Style filiform, stigma capitate.

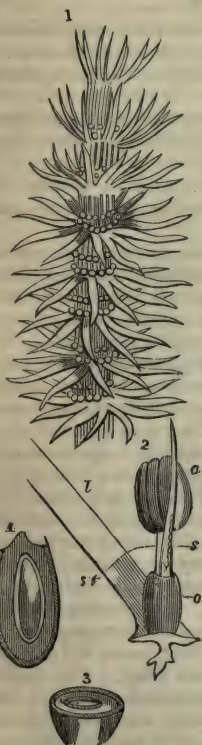


Fig. 146.—1. *Hippuris vulgaris*, part of the stem. 2, Flower of the same; *o*, ovary; *s*, style; *st*, stamen; *a*, anther; *l*, portion of leaf. 3, Transverse section of fruit. 4, Longitudinal ditto.

ing segments (lobes). and a small tuft of hairs

Fruit angular, crustaceous, one-seeded, crowned with the persistent perianth. The sole British species of this genus may be known by its prostrate, rigid habit, minute perianth, and inferior fruit. It has recently been discovered to be of a parasitic nature.

T. humifusum, D. C. *Linophyllum*, Linn. Bastard Toad-flax. E. B. 247, L. C. 957. Roots woody and knobby above, usually producing numerous filiform, spreading or ascending leafy stems. Leaves linear, very narrow, pointed, pale or yellowish green. Flowers alternate on spreading pedicels, subtended by three very unequal bracts, the middle one thrice as long as the flower. Perianth greenish or yellowish white, salver-shaped. Fruit ovate or roundish, with longitudinal ribs, surmounted by the limb of the persistent perianth. On chalky and limestone hills. Parasitic (?). Perennial. June, July. A. 5, C. 15. Lat. 50°—53°. Alt. 0—100. T. 51°—48°.

ORDER L.—**ARISTOLOCHIACEÆ**, Juss. THE BIRTHWORT FAMILY.

Herbs or shrubs, often climbing. Leaves simple, petiolate, alternate. Flowers axillary and solitary. Stamens six-ten, either distinct or



Fig. 147.—*Aristolochia Clematidis*. 1, Entire flower; 2, section of flower, showing the stamens and ovary; 3, the six united stamens before the opening of the anthers; 4, the same, with the anthers opened; 5, the ripe fruit; 6, section of seed, showing the position of the embryo; 7, the embryo. All magnified but 1.

gynandrous (adhering to the style and stigmas). Ovary inferior, three or six-celled, with numerous ovules. Fruit three or six-celled, either

dry or succulent, many-seeded. The two British species of this order are among the rarest of both our reputed and genuine British plants. They abound in the warm regions of South America, and are not uncommon in the temperate and cold regions of Europe, Asia, and America. Their general properties are bitter, tonic, and stimulant.

SYNOPSIS OF THE GENERA.

Aristolochia. Stems climbing. Perianth tubular, inflated at the base. Anthers attached to the style.

Asarum. Stem short, bearing a solitary bell-shaped flower.

Aristolochia, Linn. Perianth tubular, united with the ovary at its lower part, inflated, globular near the base, tubular, dilated, irregular, with a single lobe. Stamens six. Anthers nearly sessile, adhering to the style. Style short, six-lobed. Capsule six-celled.

A. Clematitis, Linn. Birthwort. E. B. 398, L. C. 959. Root widely and deeply creeping. Stems angular, furrowed, erect or climbing. Leaves deeply cordate, ovate or reniform, leathery, with prominent reticulate nerves. Flowers yellow, in axillary tufts. Fruit large, pear-shaped, drooping. Does it ever produce fruit in this country? Naturalized. On ruins and old walls. Perennial. July.

On an old wall, Hemswell, near Spittal, Lincolnshire, in 1830.—A. I. Alien. A. 5.

Asarum, Tourn. Perianth campanulate, three-cleft, lobes equal. Stamens twelve, inserted at the base of the style. Anthers surmounted by the prolonged subulate connective. Style short. Capsule six-celled, surmounted by the persistent limb of the calyx.

A. europæum, Linn. Asarabacca. E. B. 1083, L. C. 958. Root long and creeping, with whitish fibres. Stems short, round, tenacious, only one-two inches high, bearing one or two pairs of opposite leaves, which are only apparently radical. Leaves reniform, leathery, shining above, pale green beneath. Flower solitary, drooping, terminating the stem. Segments of the perianth ovate, incurved, of a dull green colour, large, downy. "Filaments extending beyond the anthers." Perennial. June. Seeds wrinkled horizontally. Apparently naturalized in woods in the north of England and Scotland. Rare. Perennial. May.

A. 3, C. 3. Lat. 53°—55°. Alt. 50—200 yards. T. 48°—47°.

GROUP III.—**Dichlamydeæ**. Perianth double (calyx and corolla both present); petals united (corolla gamopetalous, or of one piece.)

† Ovary free, calyx persistent.

The orders in this division, viz., LI. to LXIX. inclusive, may be synoptically distinguished as under, viz.:—

Plantaginaceæ, by their broad and strongly-ribbed, or else fleshy

leaves, also by their acauline habit and by their spicate and minute flowers.

Plumbaginaceæ, by their tubular-plaited calyx and monospermous ovary.

Primulaceæ, by their regular flowers, five stamens, rarely four-seven, opposite the lobes of the corolla, and by the one-celled, many-seeded capsule.

Lentibulaceæ, by their habitats, water or watery places, and their flower-bearing, scaly scapes (flower-stalks).

Labiataæ, by their four-angled stem, opposite leaves, didynamous stamens and four-lobed ovary. The *Verbena* family is separated from the latter by the coherence of its carpels.

Orobanchaceæ, by their succulent, scaly, upright stems, persistent corollas, and numerous seeds.

Scrophulariaceæ, by their didynamous stamens and ringent or two-lipped corollas, or by their two stamens and irregular or unsymmetrical corolla and two-celled ovary.

Verbascaceæ, by their virgate habit, showy, slightly irregular, rotate flowers, by their stamens with unequal hairy filaments, and by the two-celled capsular fruit.

Solanaceæ, by their usually symmetrical, deciduous corolla, and five equal stamens.

Boraginaceæ, by their rough alternate leaves and nucamentaceous fruit (two-four hard carpels).

Cuscutæ.—The *Dodders* and British *Convolvuli* are climbing plants, the former parasitic without leaves, the latter have leafy twining stems, and large flowers, with plaited prefloration.

Polemoniaceæ have a three-celled ovary, with few ovules.

Gentianaceæ are known by their smooth, sessile, opposite leaves, square stem, and persistent corolla.

Apocynaceæ, by their trailing stems, evergreen shining leaves and conspicuous corolla.

Oleaceæ, by their habit, fruit, and foliage.

Aquifoliaceæ, by their arboreous habit, lobed, leathery, dilated leaves and baccate fruit.

Ericaceæ. The *heaths* are small shrubs with evergreen, entire, and often linear and acicular leaves, a persistent corolla, and a many-celled and many-seeded capsule.

ORDER LI.—**PLANTAGINACEÆ**, Juss. THE PLANTAIN FAMILY.

Mostly herbaceous plants with radical flower-stalks. Leaves all radical (in the British species), entire, toothed, or pinnatifid. Flowers perfect, rarely of one sex. Sepals united at the base, persistent. Corolla gamopetalous, scarious, persistent, with a four-cleft limb. Stamens four, alternate, inserted on the tube of the perfect flowers, hypogynous in the unisexual. Filaments very long, capillary. Ovary

one-two-four-celled; ovules one-two or more in each cell. Style longer than the corolla simple; stigma filiform. Fruit invested by the permanent calyx and corolla, capsular, membranous, one-two or few-seeded, opening circularly (a pyx). Seeds erect, solitary, or two or more. Albumen thick, fleshy. Embryo straight.

SYNOPSIS OF THE GENERA.

Plantago. Flowers perfect, in spikes.

Littorella. Flowers monœcious. Males solitary, on radical filiform peduncles.

I. *Plantago*, Linn.

7 Plantain. Leaves simple, with prominent ribs radical (in the British species). Spikes solitary, bracteate. Calyx four-parted. Corolla tubular, with a four-cleft limb reflexed after fecundation. Stamens four, inserted in the tube of the corolla. Fruit membranous, opening circularly, two-four or eight-twelve-seeded sometimes with an imperfect partition. Seeds peltate, convex on the back, hollow on the face. Embryo central.



Fig. 143.—*Plantago arenaria*. 1, Entire flower with its bract. 2, The same, detached from the bract; *a*, the bract; *b*, the calyx; *c*, the corolla. 3, The same as 2 (the inner face). 4, Section of the two-celled ovary; *d*, lower half of the capsule. 5, Mature fruit. 6, The same opened; *a*, the lower valve; *b*, the upper; *c*, the two seeds; *e*, the remains of the persistent corolla. 7, Section of the seed.

SECT. I.—Perennials. Capsule two-celled. *P. arenaria* is annual and caulescent.

1. ***P. major***, Linn.
Greater Plantain. E. B.
1558, L. C. 901. Leaves

erect or slightly spreading, on long petioles, ovate-oblong, either entire or laxly-toothed, large, glabrous or downy, with five-eleven prominent nerves. Flower-stalk radical, cylindrical, tapering, rigid. Spikes *very much elongated*, flowers slightly distant at the base. Bracts ovate, concave, blunt, membranous at the borders. Lobes of the corolla ovate. Fruit a two-celled capsule, with four-six seeds in each cell. Waysides, meadows, villages. Perennial. June.

A. 18, C. 82. Lat. 50°–61°. Alt. 0–550 yards. T. 52°–41°.

Sub-var. Stem more or less leafy. Spike with a few abortive leaflets at the base.

Sub-var. Spike leafy.

These monstrosities rarely occur in chalky districts.

2. **P. media**, Linn. Hoary Plantain. E. B. 1559, L. C. 902. Leaves in a rosette, usually close to the ground, oblong or ovate, pointed, on winged tapering petioles, downy or hairy, especially below, with five-seven prominent nerves. Flower-stalks radical, usually bent at the base, erect, round or slightly angular, striated or furrowed, hairy. Flowers *in oblong, cylindrical, short spikes*. Bracts lanceolate, keeled. Fruit two-celled, with one, rarely two seeds in each cell. Waysides, grassy places, meadows, &c., in chalky or limestone soils. Perennial. June.

A. 14, C. 50. Lat. 50° — 57° (60°). Alt. 0—200 yards. T. 51° — 47° .

3. **P. lanceolata**, Linn. Rib Grass. E. B. 507. L. C. 903. Leaves erect or spreading, lanceolate, attenuated below, with distant teeth, three-five-nerved, hairy, rarely smooth. Flower-stalks radical, angular, furrowed, downy or smooth. Spikes ovate or oblong, cylindrical, short, compact. Bracts keeled, triangular, with broad, scarious, brown edges. Lobes of the corolla acutely pointed. Fruit capsular, two-celled, with one seed in each cell. Meadows, pastures, and grassy places. Perennial. May.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—700 yards. T. 52° — 39° .

Var. *lanata*. Leaves elliptical lanceolate, woolly. Kerbistu, Orkneys. Mr. J. T. Syme.

Sometimes found with stem-leaves, and more than one spike.

4. **P. maritima**, Linn. Sea Plantain. E. B. 175, L. C. 904. Leaves linear, tapering, grooved above, convex below, fleshy. Flower-stalk round, tapering, downy. Spikes slender, cylindrical, sometimes with two linear triangular short leaves at the base. Bracts ovate, closely investing the fruit. Capsule winged, two-seeded. Shores of the sea, and of tidal rivers. Not uncommon. On mountains, rare. Perennial. June, July.

A. 18, C. 60. Lat. 50° — 61° . Alt. 0—450 yards. T. 52° — 42° .

P. arenaria, Waldst. and Kit. (See Fig. 148.) Root annual; whole plant, glandular. Stem erect, simple or branched, *very leafy*. Peduncles axillary, opposite, much longer than the leaves. Spikes ovate, compact, calyx divisions scarious, the outer pair lanceolate, the inner broadly spatulate. Fruit two-celled, with a single seed in each. Annual. July—September. At Wandsworth, by the river between the steam-boat pier and Mr. Watney's distillery. In this locality there are several other exotic plants of the genus *Plantago*, among which *P. lagopus* is well established. This resembles *P. lanceolata* more than any other British species. It may be known by the hoary aspect of its leaves and by its short spike, which has some resemblance to the spike of *Trifolium arvense*. (Hare's-foot Trefoil.) It is a native of France, Italy, Spain, &c.

SECT. II.—Capsule three-four-celled.

5. **P. Coronopus**, Linn. Buckthorn Plantain. E. B. 892, L. C.

905. Leaves in a rosette, *pinnatifid*, rarely linear and entire; *lobes distant, linear, entire or toothed*, hairy, ciliated. Peduncles spreading or ascending, round, downy. Spikes cylindrical or oblong. Bracts broad, ovate, acuminate, entire or toothed at the base. Capsule three-four, one-seeded cells. Dry gravelly and sandy places. Annual (?). June.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

II. Littorella, Linn. Shore-weed. Leaves all radical, linear, entire, fleshy. Male flowers generally solitary; female sessile and axillary. Calyx in the male flowers of four sepals. Corolla monopetalous, tubular, persistent, with a four-parted limb and ovate, acute, somewhat spreading segments. Stamens four, on very long, flaccid filaments, with cordate anthers. Calyx of female flowers in four sepals. Corolla tubular, in three-four, unequal, acute segments. Ovary elliptic-oblong, with a very long style, and acute, simple stigma. Fruit one-celled, one-seeded. Seed erect, ovate-oblong.

L. lacustris, Linn. Common Shore-weed. E. B. 468, L. C. 905. Produced under water, and flowering only when the water is dried up. Rhizomes filiform, horizontal, producing separate plants. Root fibrous. Leaves fleshy, linear, pointed, channelled and enlarged at the base. Filaments six-eight times longer than the calyx. Capsule reticulate-punctate. Edges of gravelly ponds on heaths. Perennial. July.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—44°.

ORDER LII.—**PLUMBAGINACEÆ**, Juss. THE LEAD-WORT FAMILY.

Herbs or under shrubs. Leaves simple, alternate or clustered. Flowers panicled or capitate. Calyx tubular, plaited. Corolla five-cleft, sometimes polypetalous. Stamens five, opposite to the lobes in the monopetalous, and adhering to the petals in the polypetalous species. Styles five, free or united. Ovary one-celled, with one inverted ovule. Fruit utricular, with a single pendulous seed. These are distinguished from other monopetalous plants by their plaited calyx and solitary ovule. They differ from *Plantaginaceæ* in having panicled or capitate, not spicate flowers. They are chiefly found in the salt marshes and by the sea-shores of temperate regions. *Armeria maritima* (Sea-pink) grows both on the sea-shore and on the tops of the highest mountains. One of the Plantains, *P. maritima*, is found in similar habitats. Their inorganic constituents are said to be affected by the difference of habitat.

SYNOPSIS OF THE GENERA.

Armeria. Leaves linear; flowers in heads.

Statice. Leaves dilated; flowers in unilateral branched spikes.

I. Armeria, Willd. Thrift. Leaves radical, linear. Flowers

in heads on radical peduncles, subtended by a common involucre. Petals united at the base. Distinguished from *Statice* by the tufted radical leaves, capitate flowers, and cylindrical scape (peduncle).

1. *A. maritima*, Willd.

Statice maritima, Linn.
Common Thrift. E. B. 226, L. C. 895. Leaves all radical, in dense tufts, linear, one-nerved, smooth. Stems several, erect, round, hairy or downy. Flowers terminal in dense heads. Calyx-teeth much shorter than the tube, awned. Petals distinct oblanceolate, tapering into long claws. *β. alpina*. Leaves broader (?). On the sea-shore and on muddy banks of tidal rivers. Var. *β.* in mountainous and alpine places. Perennial. June–August.

A. 18, C. 60. Lat. 50°–61°. Alt. 0–1200 yards. T. 52°–35°.

Note.—There are several varieties of this plant, viz., *α. maritima*, *β. scotica*, *γ. pubescens*, *δ. Duriuscula*, which are species according to some authors. (See L. C., p. 9.)

The following attempt to establish three or more species on the ruins of one is from the "Bot. Gaz.," vol. i., p. 205:—

Armeria, Willd. Calyx-tube hairy all over, both on the ribs and in the intervals.

SECT. II.—*Plagiobasis*. § 1. *Holotrichæ*, Boiss.

A. maritima. (See character as above.)

A. pubigera, Boiss, may be distinguished from *A. maritima* by the short pedicels (half the length of calyx-tube); in the former species the pedicel is equal to the calyx-tube.

§ *Pleurotrichæ*. Calyx-hairy only on the ribs. (*Statice*, *Armeria*, E. B. 226.)

A. pubescens, Link. Leaves linear, flat.

A. duriuscula. Leaves linear, subtriquetrous, hairy, &c. &c.

2. *A. plantaginea*, Willd. Plantain-leaved Thrift. E. B. 2928, L. C. 896. Stem rigid, slightly tubercular. Leaves radical, linear-lanceolate, three-five-nerved. Outer bracts of head dilated at the base,



Fig. 149.—*Armeria maritima*. 1, Entire plant; 2, single flower magnified; 3, section of same, showing the stamens and styles; 4, ovary and styles; 5, ovary; 6, transverse section of the same, showing the single ovule. All magnified except 1.

tapering, pointed, intermediate ones round, with a short point. Calyx awned. Corolla longer than the awned calyx, of a bright pink colour. Jersey. Perennial. June, July.

Sarnian (a plant of the Channel Islands).

II. Statice, Tourn. Sea Lavender. Stems rigid, erect, branched at the top. Leaves radical, in a rosette. Calyx monosepalous (gamosepalous), funnel-shaped at the base, with a plaited five-toothed margin (limb). Corolla consisting of five petals, which are united at the base. Fruit cylindrical-oblong, one-celled, one-seeded, covered by the permanent calyx. Seed pendulous.

1. **S. Limonium**, Linn. Sea Lavender. E. B. 102, L. C. 897. Stem stout, rigid, striated, smooth, leafless, branching above, with pointed, scarious, sheathing scales. Leaves radical, or on the base of the barren shoots, elliptic-oblong, stalked, leathery, with prominent midrib, and with minute scale-like papillæ on both sides. Branches angular or furrowed, *much divided*; *secondary branches unilateral*. Bracts with scarious margins; inner ones obtuse, toothed at the top. Lobes of the calyx triangular toothed, often with intermediate teeth between them. Petals narrowing below into concave claws. Salt marshes. Perennial. July, August.

A. 13, C. 30. Lat. 50°—56°. Alt. 0. T. 52°—48°.

2. **S. rariflora**, Drej. *S. bahusiensis*, Fr. Few-flowered Sea Lavender. E. B. 2917, L. C. 898. Stem erect, branching, tubercular or slightly downy; branches erect, the ultimate ones bearing numerous sessile, unilateral, *distant, solitary flowers*. Leaves *oblong-lanceolate*, tapering into long leaf-stalks, with a rather long subulate point; outer bracts broad, abruptly pointed; inner bracts obtuse, scarious, and pinkish at the edges. Segments of the calyx short, acute. Flowers sometimes in pairs, on short pedicels. Spikelets one-three-flowered, unilateral, loosely arranged, in erect or incurved spikes. Muddy sea-shores. Kent, Hants. Perennial. July, August.

A. 6, C. 10. Lat. 50°—55°. Alt. 0. T. 51°—48°.

3. **S. spathulata**, Desf. *S. binervosa*. Spathulate-leaved Sea Lavender. E. B. 2663, L. C. 899. Stems in tufts, wiry, branched almost from the base, erect, tubercled, with unilateral, simple, or compound branches, subtended by a scale-like leaflet. Flowers on the upper parts of the branches or branchlets sessile, compact, *in two rows*, unilateral. Leaves in dense rosettes, spathulate, tapering into membranous, winged, rather broad foot-stalks, with a very short point (mucro). Bracts light brown, with broad scarious margins. Segments of the calyx blunt. Spikelets two-four-flowered. Calyx-border deep, membranous. Petals emarginate (notched). Rocky shores. Perennial. July, August.

A. 10, C. 20. Lat. 50°—55°. Alt. 0. T. 52°—48°.

S. occidentalis, Lloyd. Spikes slender, linear, suberect.

4. **S. reticulata**, Linn. Matted Sea Lavender. E. B. 328, L. C. 900. *S. caspica*. Root woody. Stem much branched. Leaves

small, spatulate, stalked, branches zigzag, interlacing or entangled, with a bract at the base of each, *the lower branches are barren* and often reflexed. (Sm.) Flowers in one-sided, terminal, dense spikes. *Calyx-segments acute*. On muddy sea-shores on the east coast. Perennial. July, August.

A. 1, C. 2. Lat. 52°—53°. Alt. 0. T. 49°.

ORDER LIII.—**PRIMULACEÆ**, Vent. THE PRIMROSE FAMILY.

Herbaceous plants, with opposite, rarely alternate, leaves. Flowers regular, solitary, axillary or aggregate, in clusters, or in terminal umbels, or panicles. Calyx five, rarely four-seven united sepals. Corolla gamopetalous, with five, rarely four-seven, entire or notched lobes. Stamens inserted in the tube of the corolla, as many as, and opposite to, the lobes of the corolla. Filaments free or united below. Ovary free, rarely adherent to the calyx (*Samolus*), one-celled, with many ovules, on a central placenta. Style simple. Stigma entire. Fruit capsular, round, one-celled, many-seeded, opening at the apex or longitudinally by valves, which are equal in number to the divisions of the calyx, sometimes opening by a lid. Seeds in depressions of the placenta. Albumen fleshy or horny. Embryo parallel to and distant from the hilum.



Fig. 150.—1, *Primula veris*; 2, single flower; 3, section of the same, showing the stamens, ovary, and style; 4, section of ovary, showing the ovules; 5, stigma.

TRIBE I.—Capsule opening longitudinally by several valves.

SYNOPSIS OF THE GENERA.

Primula. Leaves simple. Calyx bell-shaped or tubular.

Hottonia. Leaves pinnate. Fruit capsular, scarcely opening.

Cyclamen. Segments of the corolla reflexed. Capsule opening by five teeth.

Lysimachia. Leaves entire. Capsule opening completely.

Trientalis. Calyx and corolla seven-parted. Stamens seven.

Glauz. Calyx coloured, corolla absent. Capsule opening by five valves.
Samolus. Capsule united with the tube of the calyx.

TRIBE II.—Capsules opening circularly by a lid.

SYNOPSIS OF THE GENERA.

Anagallis. Calyx five-parted.
Tentunculus. Calyx four-parted.


I. *Primula*, Linn. Primrose, Cowslip, Oxlip. Perennial plants with thick truncate roots. Leaves all radical in a rosette. Flowers yellow or pink, in simple umbels, or solitary on radical peduncles. Calyx campanulate or tubular, often angular or inflated with a five-toothed or five-cleft limb. Corolla funnel-shaped, rarely salver-shaped; tube dilated where the stamens are inserted; limb five-parted, with obtuse notched or cleft lobes. Stamens five, included, inserted on the upper part of the tube. Valves of the capsule entire or cleft. Seeds angular, shagreened. All the species of this genus are of special interest to the florist, and all of them are cultivated, some in the shrubbery, some in the garden, and some in the conservatory. They are readily known from the other plants of this order by their radical leaves being in a rosette, by their round, tapering, umbel-bearing scapes and handsome flowers of almost all colours, except blue.

1 ***P. veris*, Linn.** Cowslip. E. B. 5, L. C. 880. Leaves ovate or oblong, abruptly contracted at the base into a winged petiole, unequally toothed, or with lax crenulations, undulate, pubescent beneath. Stalks (radical peduncles) usually longer than the leaves. Pedicels unequal, usually short, flowers often drooping to one side. Calyx somewhat inflated, with short, triangular, bluntish teeth. Corolla pale yellow, with a concave limb; lobes with a deep yellow spot at the base. Meadows and woods. Perennial. April, May.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—450 yards. T. 51°—42°.

2 ***P. elatior*, Jacq.** Oxlip. E. B. 513 (?), L. C. 879. Flower-stalks erect, stout, tapering, hairy. Leaves ovate, blunt, slightly tapering below into winged leaf-stalks, serrated with minute, spreading teeth. Umbel many-flowered, drooping. Calyx with triangular acuminate segments. Corolla with a longer tube and a paler, less concave limb than the corolla of *P. veris*; the base of the lobes is marked with deep yellow spots, forming a circle round the throat. In woods. Bardfield, Essex. Mr. H. Doubleday. Perennial. April, May.

A. 2, C. 3. Lat. 51°—53°. Alt. ? T. 49°—48°.

3 ***P. vulgaris*, Huds.** *P. acaulis*, Jacq. Common Primrose. E. B. 4, L. C. 878. Leaves oblong or obovate, tapering into winged petioles, unequally toothed or laxly crenulate, wrinkled and reticulate, nearly glabrous on the upper face, pubescent on the under side. Peduncles abortive, rarely present, and when so the plant is caulescent.  Var. *caulescens*. Peduncles slender, about as long as the leaves, hairy. Calyx acute-angled, pubescent, with lanceolate acuminate teeth. Corolla

pale yellow, with a large and *nearly flat limb*; lobes notched, with a deep yellow spot at the base. Woods and hedges. Perennial. March—May. Var. *caulescens* is sometimes mistaken for *P. elatior*, which is a very distinct plant.

4. **P. farinosa**, Linn. Bird's-eye Primrose. E. B. 6, L. C. 881. Stalk erect, round, downy, of variable length. Leaves *spathulate* or *obversely lanceolate*, laxly toothed, hoary below, pale green above. Flowers umbellate, pink or white. Calyx teeth very short, blunt. Segments of the corolla obcordate, elongated, deeply notched, lobes rounded, flat. Fruit obovate. Boggy places, in the West Riding of Yorkshire. Not uncommon. Perennial. July.

A. 5, C. 8. Lat. 54°—56°. Alt. 50—300 yards. T. 47°—45°.

5. **P. scotica**, Hook. Scottish Bird's-eye Primrose. E. B. 2608, L. C. 882. Stems erect, four-eight inches high. Leaves *obovate-lanceolate* (oblong, tapering towards the base), toothed. Flowers two-three. Calyx swollen, with short, ovate, blunt segments. Corolla flat, with obcordate segments, bluish purple, with a yellow centre. Ovary roundish. Every part of the plant mealy. Sandy heaths in the north of Scotland. Perennial. July.

The chief difference between this and the preceding is in size. *P. farinosa* is about twice as large as *P. scotica*.

A. 2, C. 4. Lat. 58°—60°. Alt. 0—100 yards. T. 46°—44°.

II. Hottonia, Linn. Aquatic perennial plants, with submersed pinnate-pectinate (like a comb) leaves, with round stems above the water. Flowers pale rose-colour, or white, with a tinge of red, arranged in distant verticils (whorls). Calyx five-parted, segments linear. Corolla salver-shaped, with a five-parted limb. Ovary globular, pointed, with a short style and globose stigma. Capsule nearly indehiscent (not opening) or opening by five valves from the summit to the base, with numerous seeds, on a large, globular, central placenta. Radicle directed towards the hilum. The aquatic habitat, the multifid leaves with setaceous segments, the round stems rising above the water, and the whorls of elegant rose-coloured flowers will be sufficient to distinguish this genus.

1. **H. palustris**, Linn. Common Water Violet or Water Milfoil. E. B. 364, L. C. 885. Lower or submersed part of the stem oblique or horizontal, leafy, the aerial or upper part erect, leafless, round, tapering, naked, eight-twelve inches high. Leaves disposed in contiguous whorls, pinnate-pectinate, with linear (almost setaceous) pointed segments. Flowers in five-seven distant whorls, with four-seven flowers in each whorl. Pedicels glandular, spreading, deflexed after flowering. Divisions of the calyx linear, about as long as the tube of the corolla. In luxuriant forms, some flowers (one or two in a whorl) have the corolla in six divisions, but in this case the calyx is six-parted. In ponds and ditches. Perennial. May, June. This elegant plant is now almost extinct near London. It has probably disappeared in Letchmere, Wandsworth Hill. The sewage from the

greatly-increased population has poisoned the water, and nearly all the plants have perished.

A. 12, C. 40. Lat. 50° — 55° . Alt. 0—100 yards. T. 51° — 47° (?).

Note.—The temperature is not given in “Cybele.” (See vol. ii., p. 296.)

III. *Cyclamen*, Linn. Sow-bread. Herbaceous, smooth, stemless, perennial plants, with fleshy, intensely bitter roots and variegated, simple leaves. Calyx angular, cleft into five ovate segments. Corolla rotate, with five lanceolate, oblique, reflexed segments, throat prominent, naked. Filaments very short, style straight. Capsule globular, opening with five teeth. Seeds numerous. This genus is readily distinguished by the stock-root, the handsome leaves, solitary pedunculate flowers, with reflexed segments. Although there is scarcely a doubt about the exotic origin of the sole, barely reputed, British species, yet it has obtained a place in all recent works on our indigenous flora.

***C. hederifolium*, Willd.** Ivy-leaved Sow-bread. E. B. 548, L. C. 883. Root globular. Leaves cordate-angular, finely-toothed, beautifully variegated with dark and glaucous green, on round, glandular footstalks. Peduncles round, tapering, taller than the leaves. Flowers drooping. Corolla pink or white, twisted before flowering, with two prominent cartilaginous teeth at the base of each segment. After flowering, the peduncle coils up and buries the fruit. Woods. Sandhurst, near Cranbrook, Kent. Perennial. August—October.

A. 2, C. 2. Lat. 51° — 53° . Alt. 0—50 yards. T. 49° .

IV. *Lysimachia*, Linn. Loosestrife. Herbaceous, perennial plants, with creeping shoots, and simple, undivided, entire leaves, which are usually opposite or whorled. Flowers yellow, terminal and aggregate or axillary, and in this case usually solitary. Calyx five-cleft or five-parted, with acute, spreading segments. Corolla rotate, not tubular; limb widely expanded, in five deep segments. Stamens five, insertion opposite and basal, with oblong anthers notched at each end. Ovary roundish, with a thread-shaped style and obtuse stigma. Fruit capsular, globular, pointed, one-celled, ten-valved. Seeds numerous, covering a large central, rounded, pitted placenta. The habit of the plants in this genus is as variable as their habitats. The British species agree in having yellow flowers.

SECT. I.—Filaments united at the base. Capsule five-valved.

1. *L. vulgaris*, Linn. Yellow Loosestrife. E. B. 761, L. C. 886. Stems stout, erect, branching, furrowed, downy, leafy, about a yard high. Leaves ovate or oblong-lanceolate, downy, opposite, or sometimes nearly whorled, rarely alternate. Flowers in compound or simple terminal panicles. Divisions of the calyx lanceolate-pointed, with a membranous red margin. Corolla large, yellow, handsome. Stamens united below (at the base). Sides of rivers, and watery, shady places. Perennial. July.

A. 16, C. 60. Lat. 50° — 58° . Alt. 0—200 yards. T. 51° — 46° .

2. **L. thyrsiflora**, Linn. Tufted Loosestrife. E. B. 176, L. C. 887. Root creeping. Stem erect, round, tapering, quite simple, leafy. Leaves *lanceolate*, elongate, quite entire, numerous, opposite, sessile. Flowers *small*, yellow, *in dense, axillary clusters*, bracteate, on short horizontal pedicels; clusters peduncled, and situated on the mid-part of the stem, *not terminal*. Corolla deeply divided, segments (petals) spotted with red dots, and often with minute teeth between the segments. Marshy places; north of England and Scotland. Perennial. July.

A. 6, C. 9. Lat. 51° — 57° . Alt. 0—200 yards. T. 49° — 47° .

3. **L. Nummularia**, Linn. Moneywort. E. B. 528, L. C. 888. Stems numerous, *prostrate, rooting*, slender, simple, or only slightly branched. Leaves *roundish-ovate* or *almost round*, on short petioles, glabrous, opposite. Flowers axillary, *solitary*, opposite, turned to one side on pedicels which are as long as the leaves. Divisions of the calyx *ovate, pointed*, cordate at the base. Corolla deeply parted, with obovate divisions. Stamens united only at the base. Wet banks; under hedges. Perennial. July. The peripatetic florists of the metropolis call this plant Creeping Jenny. It is one of the popular window-flowers of London.

A. 13, C. 50. Lat. 50° — 56° (57°). Alt. 0—200 yards. T. 51° — 47° .

SECT. II.—Stamens free. Capsule two-valved, each valve subsequently separating into two or three pieces.

4. **L. nemorum**, Linn. Wood Loosestrife. E. B. 527, L. C. 889. Stems four-six inches long, quadrangular, reclining and rooting at the base, erect at the apex, slender, simple, or slightly branched, glabrous, leafy. Leaves on short foot-stalks, opposite, ovate-pointed, glabrous. Flowers axillary, *solitary*, on *filiform or capillary pedicels, which are longer than the leaves*. Divisions of the calyx *linear-subulate*. Corolla bright yellow, very ornamental. In moist woods and hedges. Perennial. June—August.

A. 17, C. 75. Lat. 50° — 58° . Alt. 0—800 yards. T. 51° — 38° .

L. ciliata, Linn. Stem erect, three feet high (?). Leaves lanceolate, *sub-cordate, with ciliated stalks*. Flowers in clusters, on axillary peduncles. Stamens ten, five barren. Near Serbergham, Cumberland. Mr. William Backhouse. (Compare "Phytologist," vol. ii., p. 431, and "Cybele," vol. ii., pp. 298-9.)

V. **Trientalis**, Linn. Chickweed Winter Green. Stem simple leafy at the top. Flowers white, axillary, pedunculate. Calyx seven-parted or of seven pieces. Corolla rotate, in seven deep-spreading segments, very slightly connected at their base. Stamens seven, inserted on the base of the segments, and opposite to them, with terminal, oblong anthers. Ovary globose, with a style as long as the stamens, rather swelling upwards. Stigma obtuse. Capsule one-celled, seven-valved, with few seeds on a central globose placenta. The simple leafy stem, and especially the septenary division of the organs of fructification, will identify this genus.

T. europæa, Linn. European Chickweed Winter Green. E. B. 15, L. C. 884. Root somewhat creeping. Stem solitary, simple, erect, round, with a few scattered, small, ovate leaves, which mostly fall off before flowering. Leaves (the permanent ones) obovate, with abrupt bluntish tips, or obovate-oblong, crowded, nearly sessile, quite entire, smooth, with prominent nerves bearing a single pedicel in the axis of the lower one. Flowers solitary, on long slender stalks, white, seven-nine cleft, sometimes five-six cleft. Seeds black, with white reticulated coatings. Woods and moors in the north of England and Scotland. Perennial. May—June.

A. 8, C. 20. Lat. 53°—61°. Alt. 50—950 yards. T. 46°—37°.

VI. Glaux, Linn. Sea-Milkwort. Prostrate herbs, with leafy round stems, and solitary axillary flowers. Perianth *single*, coloured, campanulate, with five deep, spreading, recurved segments. Stamens five, alternate with the segments. Filaments awl-shaped, erect, with roundish anthers. Ovary ovate, with a cylindrical style and capitate stigma. Fruit capsular, one-celled, five-valved, seeds few, attached to a large pitted, central placenta. This last character is almost the only one which the genus has in common with *Primulaceæ*. It is known by its short leafy stems, small leaves, axillary flowers, single perianth, and maritime habitat.

G. maritima, Linn. Sea-Milkwort, or Glasswort. E. B. 13, L. C. 894. Stem more or less procumbent, winged, with numerous branches. Leaves small, ovate, opposite, sessile, more or less fleshy. Flowers axillary, sessile, or nearly so, solitary. Perianth single, with obtuse, pinkish segments. Salt marshes and sea-shores, and the banks of tidal rivers. Perennial. July.

A. 18, C. 60. Lat. 50°—61°. Alt. ? T. 52°—45°.

VII. Samolus, Linn. Brookweed. Stem erect. Leaves alternate, undivided, tapering at the base. Inflorescence terminal, racemose, bracteate. Calyx adhering to the lower half of the ovary, with a five-cleft limb, and deep triangular segments. Corolla funnel-shaped, with a wide tube and a spreading limb, and five scales at its mouth. Stamens five, on short filaments, inserted into the middle of the tube. Anthers roundish, two-lobed, sheltered by the scales. Ovary half inferior, nearly globular, with an erect short style, and capitate stigma. Fruit capsular, round, five-valved, many-seeded. This may be distinguished from the other British primulaceous genera by the upright, leafy, somewhat succulent stalk, smooth, entire, small leaves, small white flowers in clusters, half inferior ovary, and marshy habitat.

S. Valerandi, Linn. Brookweed. E. B. 703, L. C. 893. Root short, truncate, with many fibres. Stems erect, solitary or several, leafy. Leaves glabrous, oblong or obovate; root-leaves in a rosette, tapering into petioles; stem-leaves alternate, on short stalks. Peduncles bracteate. Flowers white, small, in clusters, elongated when ripe. Divisions of the calyx ovate-triangular. Corolla with a spread-

ing limb. In boggy places by the sides of ditches. Perennial. July.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

TRIBE II.—Capsule opening circularly by a lid.

SYNOPSIS OF THE GENERA.

Anagallis. Calyx five-parted. Corolla with a very short or no tube, with a rotate limb.

Centunculus. Calyx four-parted. Corolla with a roundish tube.

VIII. **Anagallis**, Linn. Pimpernel. Herbaceous or slightly shrubby, annual or perennial plants. Leaves usually opposite, often dotted. Flowers axillary, pedunculate, solitary. Calyx five-parted, with acute, keeled segments. Corolla rotate, with a nearly flat, five-parted limb, and no tube; segments narrowing at the base. Stamens five, inserted on a short, slightly elevated ring under the lobes of the corolla, furnished more or less with glandular hairs. Anthers cordate. Ovary round, with a thread-like style, and capitate or sometimes simple stigma. Capsule round, one-celled, *pyxid* (opening by a lid). Seeds many, covering a large, central, round, pitted placenta. The British species of this genus are distinguished by their decumbent or creeping habit, by their solitary, axillary flowers, and by their thin, pellucid, round capsules, which split horizontally into two hemispherical valves.

1. **A. arvensis**, Linn. Poor Man's Weather-glass. E. B. 528, L. C. 890. Roots annual, branched and fibrous. Stems prostrate or ascending, diffuse, branched, four-angled, and slightly winged. Leaves sessile, opposite, ovate or oblong, with black small dots on their under surface. Pedicels longer than the leaves, reflexed when in fruit. Divisions of the calyx (sepals) lanceolate, acuminate, with membranous borders, spreading when in flower, erect when in fruit (?). Corolla red, rotate, with rounded ovate or oblong, slightly crenulate lobes, rather longer than the calyx. Filaments hairy, and united at the base. Plentiful between Brompton and Kensington, where no example of *A. cærulea* was noticed. Fields. Annual. June—October.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

A. cærulea. Blue Pimpernel. E. B. 1823, L. C. 890 b. Stem angular, more or less winged. Leaves opposite, sessile, ovate, pointed. Pedicels twice as long as the leaves. Sepals lanceolate, pointed, with scarious margins. Petals (segments of the corolla) oblong or obovate, truncate or rounded, and notched at the apex, with a reddish purple base. Stamens purple and hairy. Anthers bright yellow. This variety has occurred now for several years (six) at Wandsworth, near the steamboat-pier. A single example of the red variety has not been observed during these years in this locality, where the Blue Pimpernel has been observed in abundance. Is this variety ever found with the variety *A. arvensis* (*phœnicia*)?

A. 12, C. 30. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

Note.—The upper leaves are sometimes narrower and more acuminate, the sepals longer and more tapering, and the peduncles longer than in *A. arvensis*. The seeds in both are finely shagreened or tubercled.

2. **A. tenella**, Linn. Bog Pimpernel. E. B. 530, L. C. 891. Stems numerous, *prostrate, creeping*, round, leafy, slender, about three or four inches long. Leaves roundish, broadly pointed, on short stalks, opposite. Flowers solitary and axillary, on filiform pedicels, which are reflexed after flowering. Divisions of the calyx elongate lanceolate. Petals linear lanceolate, connected at the base, twice as long as the sepals (divisions of the calyx), purplish or pink, beautifully marked with stripes of a reddish colour. Filaments densely clothed with long hairs, *united below*. In boggy places. Perennial. June—August.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—300 yards. T. 52°—45°.

Note.—The habit and general appearance of this species differ greatly from the other species of the genus.

IX. **Centunculus**, Linn. Chaff-weed. Minute herbs, with alternate, smooth, very diminutive leaves, and axillary, solitary, sessile flowers. Calyx tubular, four-parted; segments acute, spreading. Corolla with an inflated tube, four-cleft limb, and oval, flat segments. Stamens four, inserted into the mouth of the tube, with short filaments and roundish anthers. Ovary globose, in the tube of the corolla. Style erect, persistent, with a simple stigma. Fruit capsular, one-celled, bursting all round (a pyxidium). Seeds numerous, minute, covering the central, globose, pitted placenta. Known by its diminutive size, minute flowers, and globular capsule, opening by a lid; also by its marshy habitat.

C. minimus, Linn. Chaff-weed. E. B. 531, L. C. 892. Stems solitary or several, slender, erect, or ascending, a few inches high. Leaves ovate-pointed, sessile, or on very short petioles. Flowers very small, sessile or nearly so. Divisions of the calyx linear-lanceolate. Sandy moist commons. Annual. June—August.

A. 14, C. 50. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

ORDER LIV.—**LENTIBULACEÆ**, Rich. THE BUTTERWORT FAMILY.

Aquatic, herbaceous, perennial plants. Leaves all radical, the aerial ones entire, fleshy, in a rosette; the submersed much divided with filiform segments. Flowers solitary or in several-flowered clusters on radical peduncles, perfect, irregular. Calyx five-cleft, persistent, divisions nearly equal or two-lipped. Corolla irregular two-lipped; upper lip two-lobed or entire, lower lip larger, three-lobed or entire, with a spur and a more or less prominent palate. Stamens two, inserted at the base of the corolla, between the ovary and the spur. Ovary one-celled, with many ovules, on a free round placenta.

Style short, two-lobed, the inner sides bearing the stigmas. Fruit capsular, one-celled, many-seeded, two-valved, either indehiscent or opening all round (circularly) above the base. Seeds numerous, small, without albumen. Radicle towards the hilum.

SYNOPSIS OF THE GENERA.

Pinguicula. Leaves aerial (above ground), entire in a rosette.

Utricularia. Leaves submersed, divided, with filiform or capillary segments.

I. *Pinguicula*, Tournf. Butterwort. Calyx minute, five-cleft; the three upper divisions ascending, the two lower shorter and spreading. Corolla two-lipped, throat open, with a slightly-bearded palate, with a short tube, and with a spur below; upper lip shorter than the lower, notched or cleft; lower lip three-lobed, the middle lobe the largest. Stamens two, with flattened filaments, and one-celled anthers, opening transversely. Capsule ovate, pointed, one-celled, two-valved. Seeds numerous, small, nearly cylindrical. The radical leaves, flower-scapes, irregular spurred flowers, and two stamens distinguish this genus.

1. *P. vulgaris*, Linn. Common Butterwort. E. B. 70, L. C. 872. Root very short, with many fibres. Leaves ovate-oblong, tapering towards the base; thick and glutinous, bearing minute, papillæ, in a rosette, close to the ground; margins strongly inflexed. Flower-stalks solitary or several, erect, glabrous, with one drooping flower. Divisions of the calyx *lanceolate* glandular, lobes of the lower lip truncate and spreading. Corolla reddish blue; lobes *very unequal, rounded, entire, distant*; spur nearly straight (lower lip with a bearded throat, deeply-three-cleft, the lateral segments spreading and oblong, the central one ovate). Fruit erect. Bogs and moist heaths. Perennial. June.

A. 18, C. 70. Lat. 50°—61°. Alt. 0—950 yards. T. 49°—37°.

2. *P. grandiflora*, Lam. Large-flowered Butterwort. E. B. 2184, L. C. 871. Stalks six-nine inches high, stouter and more clammy than in the foregoing. Leaves more veiny and yellowier than in *P. vulgaris*. Calyx-segments *ovate, blunt*. Corolla nearly regular five-cleft, nearly twice as large as the last, and finely reticulated with deep blue veins. (Sm.) Hibernian. Bogs in the west and south of Ireland. Perennial. May.

3. *P. alpina*, Linn. Alpine Butterwort. E. B. 2747, L. C. 873. Stem (scape) erect, flexuous, slender, smooth, single-flowered. Leaves all radical, oblong, *pale-green*, entire in a rosette. Flowers solitary, terminal, yellowish, *small*; spur very short, blunt, and curved upwards; limb of the corolla unequal. Fruit acuminate. Ross-shire. Mr. W. A. Stables. Perennial. June.

A. 2, C. 2. Lat. 57°—58° (60°). Alt. 0—50 yards. T. 47°—46°.

4. *P. lusitanica*, Linn. Pale Butterwort. E. B. 145, L. C. 877. Root fleshy. Stem *three-four inches high*, clothed with viscid hairs. Leaves *pale-green*, with red veins (nerves?). Corolla pale

lilac, with a yellow throat. West and south of England, Scotland and Ireland. Perennial. June, July.

A. 7, C. 20. Lat. 50° — 60° . Alt. 0—300 yards. T. 52° — 46° .

II. *Utricularia*, Linn. Bladderwort. Hooded Milfoil. Aquatics, the British species floating by means of air-bladders. Australia abounds in species which are fixed. Leaves finely divided.

Flowers clustered, Calyx consisting of two small sepals. Corolla ringent, spurred; upper lip obtuse, erect, lower lip larger, with a prominent cordate palate. Stamens two, short, with small cohering anthers. Ovary globose. Style slender, with a two-lipped stigma. Capsule globose, one-celled, with numerous seeds on a large globular, central placenta. The British species of these plants are distinguished by their floating habit, by their finely divided leaves, furnished with air vesicles (little bladders), which serve to float them, by their clusters of yellow flowers, rising on a central stalk above the water.

Fig. 151.—*Utricularia minor* (?). 1, Portion of entire plant; 2, flower magnified; 3, ovary and bilabiate stigma; 4, section of same, showing the ovules; 5, section of seed, showing the embryo; 6, embryo.

1. *U. vulgaris*, Linn. Water Milfoil. E. B. 253, L. C. 875. Leaves spreading, with numerous vesicles, pinnate. Segments much divided, ultimate segments loosely and finely toothed. Flower-stalk erect, usually with a few distant scales, three-ten-flowered. Bracts ovate, shorter than the pedicels. Sepals ovate. Throat of the corolla prominent, with orange streaks; margin of the lower lip reflexed. Spur conical, about half the length of the corolla. Anthers slightly coherent. Stigma fringed. Fruit spreading. In ditches and other watery places. Perennial. June—August.

A 18, C. 70. Lat. 50° — 61° . Alt. 0—500 yards. T. 51° — 42° .

2. *U. intermedia*, Hayne. E. B. 2489, L. C. 876. Stems two-three-flowered. Leaves repeatedly forked, linear, with flat segments and detached bladders. Flowers yellow, smaller than in the preceding; upper lip streaked with red. Ditches, Ireland and Scotland. Perennial. July.

A. 6, C. 10. Lat. 50° — 59° . Alt. 0—200 yards. T. 51° — 46° .

3. *U. minor*, Linn. Smaller Bladderwort. E. B. 254, L. C.

877. Flower-stalks erect, leafless. Leafy shoots horizontal. Leaves sessile, compound, with *filiform, short segments, and small bladders attached*; both leaves and horizontal shoots under water. Flowers small. Sepals roundish. Corolla with a very short blunt spur. Ditches and pits in peat bogs. Perennial. June.

A. 18, C. 50. Lat. 50°—59°. Alt. 0—200 yards. T. 50°—46°.

ORDER LV.—**VERBENACEÆ**, Juss. THE VERVAIN FAMILY.

Trees, shrubs, or sometimes herbaceous plants, with exstipulate, generally opposite, leaves. Flowers in corymbs or alternate spikes. Calyx tubular. Corolla tubular, deciduous, usually with an irregular limb. Stamens four, didynamous, occasionally two. Ovary two- or four-celled, with solitary or twin ovules in each cell. Fruit nucamentous (like a nut), or baccate, with two or four adhesive nucules. The concrete carpels distinguish this from the following order. Several species are objects of floriculture. Though there be but one species and not very many individuals in England, they are numerous, and widely dispersed over Europe, Asia, South America, South Africa, and Australia.

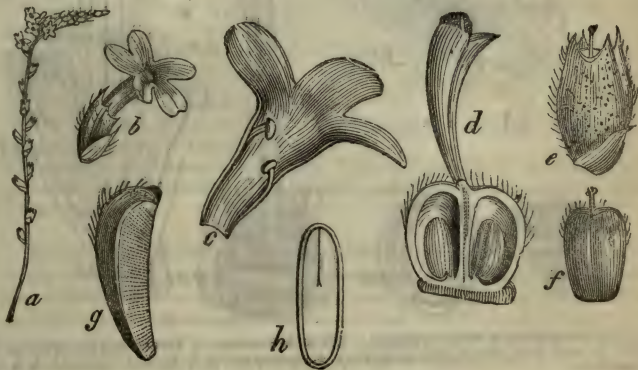


Fig. 152.—*Verbena officinalis*. *a*, Spike of flowers reduced; *b*, a single flower; *c*, a section of same; *d*, pistil and ovary cut longitudinally; *e*, fruit covered by the calyx; *f*, fruit detached from the calyx; *g*, a carpel detached; *h*, section of seed. All magnified except *a*.

Verbena, Linn. Vervain. Herbs, rarely shrubs. Leaves opposite, or whorled, simple, variable. Flowers spiked or racemose. Calyx angular, with five teeth. Corolla tubular, with a five-lobed limb, and rather unequal segments. Stamens four, rarely two, within the tube, with incumbent, two-lobed anthers. Ovary four-angled, with a slender style, and obtuse stigma. Carpels two or four, enclosed in a thin evanescent pericarp. This genus has the external

appearance of a *labiate* plant, but differs in having spiked flowers and united ovaries.

V. officinalis, Linn. Common Vervain. E. B. 767, L. C. 798. Stems few or solitary, erect or ascending, rigid, branching, hairy or rough at the angles, often glandular above. Leaves oblong or obovate, narrowed into petioles deeply incised or pinnatifid, with toothed or crenate lobes, rough with appressed hairs. Flowers small, lilac-blue, solitary, in the axis of very short bracts, arranged in a lax, slender spike. Waysides; grassy places near houses. Perennial (?). July. A. 11, C. 40. Lat. 50°–56°. Alt. 0–200 yards. T. 52°–47°.

ORDER LVI.—**LABIATÆ**, Juss. THE LABIATE FAMILY.

Herbaceous, rarely half shrubby plants, usually yielding more or less essential aromatic oil. Stems four-angled, with opposite branches. Leaves opposite, entire, toothed or incised, rarely divided. Flowers



Fig. 153.—*Melittis Melissophyllum*.—1, The flower entire; 2, carpels and hypogynous disk; 3, section of the carpels and disk; 4, ripe carpels; 5, section of seed. 2, 3, 5, magnified.

in axillary, opposite clusters, mostly sessile, or on very short stalks, apparently whorled and sometimes contiguous and spiked; rarely solitary, or in pairs. Calyx gamosepalous, persistent, regular, or almost so, in five divisions, rarely four, combined in a tube, or two-lipped, the upper lip of three pieces, entire, notched or cleft, the lower of two, the divisions are entirely connected, or more or less free. Corolla gamopetalous, caducous, rarely withering, composed of five pieces, the upper lip (helmet) of two, and the lower of three, both variously notched or cleft, sometimes apparently one-lipped, in consequence of the shortness or the deep cleft of the upper lip. Sta-

mens four, inserted in the tube of the corolla, in pairs, either equal or unequal, rarely two by abortion. Ovary composed of four carpels, with a single ovule in each. Styles united, arising from the base of the carpels. Fruit four dry one-seeded carpels, or fewer by abortion, not opening. Seed erect. Albumen absent, or very minute. Radicle directed towards the hilum.

Note.—The upper lip of the corolla, consisting of two united petals, is opposite to the three united sepals of the bilabiate calyx, and the two united sepals of the calyx are opposite to the three united petals of the corolla.

Tribe I.—*Menthoideæ*. The *Mentha*-like Tribe. Lobes of the corolla nearly equal.

Tribe II.—*Salviæ*. The *Salvia* Tribe. Corolla two-lipped. Stamens two, fertile, anther-lobes separated by a very long filiform connective, lower lobe rudimentary or absent.

Tribe III.—*Thymoidæ*. Corolla two-lipped. Stamens four, nearly equal, or the lower pair slightly longer than the upper pair.

Sub-Tribe I.—*Thymoidæ veræ*. Genuine Thyme-like plants. Stamens straight, diverging.

Sub-Tribe II.—*Melissinæ*. The *Melissa* Sub-tribe. Stamens more or less bent, converging.

Tribe IV.—*Lamioidæ*. The *Lamium*-like Tribe. Stamens four, contiguous and parallel under the upper lip of the corolla.

Sub-Tribe I.—*Nepetæ*.—The *Nepeta* Tribe. Stamens on the lip not so long as the stamens on the helmet.

Sub-Tribe II.—*Stachydæ*. The *Stachys* Tribe. Stamens on the lip longer than the stamens on the helmet.

Sub-Tribe III.—*Scutellarinæ*. The *Scutellaria* Sub-tribe. Calyx two-lipped, shut when the carpels are ripe.

Tribe V.—*Ajugoideæ*. The *Ajuga* Tribe. Upper lip of the corolla very short or absent (deeply cleft, with a portion adhering to the lateral portions of the lower lip).

TRIBE I.—***Menthoideæ***. Corolla campanulate or funnel-shaped, with nearly equal lobes. Stamens four, rarely two, distant and divergent.

Genera.—*Mentha*, *Lycopus*.

SYNOPSIS OF THE GENERA.

Mentha. Stamens four. Carpels not bordered.

Lycopus. Stamens two. Carpels with a thick margin.

1. ***Mentha***, Linn. Mint. Roots perennial and creeping. Stems erect, branched, with stalked mostly ovate leaves. Flowers capitate or spicate (verticillated racemes). Calyx tubular, erect; teeth nearly equal. Corolla funnel-shaped, limb in four spreading, nearly equal segments, the upper one with a slight notch. Carpels small, rarely perfected. The widely-spreading roots, sharply-angled leafy stems, and very dense axillary or terminal racemes of light purple flowers distinguish this genus.

1. **M. rotundifolia**, Linn. Round-leaved Mint. E. B. 446, L. C. 802. Stems erect, with blunt angles and convex sides, woolly, downy, branching above, solid. Leaves sessile, *slightly cordate at the base, crenulate, strongly wrinkled*, roundish or ovate, very blunt, woolly, hairy or downy. Flowers tufted, axillary, on short common peduncles, subtended by very small bracts, in *cylindrical compact spikes*, which are often interrupted at the base, on opposite branches. Calyx bell-shaped, roundish (when the fruit is ripe), with lanceolate-subulate teeth. Corolla white or rosy. Grassy places. Rare. Perennial. August, September.

A. 11, C. 25. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—47°.

2. **M. sylvestris**, Linn. Horse Mint. E. B. 686, L. C. 803. Stems erect, two-three feet high (shaggy), with rather blunt angles and downward pointing hairs. *Leaves ovate-roundish or ovate-lanceolate, acute, serrated*, hoary above and *shaggy below*, nearly sessile. Flowers in terminal, erect, *acute, conical-cylindrical* spikes, arranged in dense bracteate whorls of a pale purplish colour. Bracts awl-shaped. Calyx hairy, tomentose. This is said to be *M. incana*, Sole. Nine Elms, Battersea. Perennial. July—September.

A. 13, C. 30. Lat. 50°—56° (58°). Alt. 0—200 yards. T. 51°—46°.

Var. *M. vulgaris*. Leaves rugose and pubescent on the upper side, softly tomentose and white on the under side.

Var. *M. nemorosa*. Leaves ovate-oblong, green and pubescent above, laxly tomentose and white below.

Note.—No. 2 differs from No. 1 in its longer, acuter, and hoarier leaves.

3. **M. viridis**, Linn. Spear Mint. E. B. 2424, L. C. 804 (803 b, 5th ed.) Stems acutely angled, smooth. Leaves *lanceolate, acute, serrated*, sessile, *smooth*, or slightly hairy beneath. Flowers in *elongated acute spikes*; whorls distant with bristle-shaped bracts. Calyx furrowed, smooth. Corolla light purple, smooth. Style prominent. The leaves and spikes of this plant are liable to considerable variations. In specimens from Settle, Yorkshire, the leaves are ovate-lanceolate, and the spikes are dense and cylindrical. In others from near Grays, Essex, the leaves are linear-lanceolate, and the spikes filiform, with very distant whorls. The examples of the latter form are from an old chalk quarry, overgrown with a dense cover of underwood. In moist and dry places. Rare. Perennial. September.

A. 11, C. 20. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

4. **M. pratensis?** Sole. Meadow Mint. E. B. 449, L. C. 807. *M. sativa*, (e.) *pratensis*. Stems erect, tufted, one or two feet high, usually glabrous, with spreading branches. Leaves lanceolate, serrated, sharp, nearly sessile, contracted at the base. Peduncles purplish, *smooth*, whorls (clusters) *distant, globose*. Calyx tubular, smooth, bell-shaped, with hairy teeth. Corolla light purple, bearded at the summit. Stamens short. A variety of *M. arvensis* (?). In watery places. Perennial. August, September.

The area, &c., of *M. sativa*, with which, or under which, this species or form is placed is as follows, viz. :—

A. 16, C. 50. Lat. 50°—57° (58°). Alt. 0—200 yards. T. 52°—47°.

M. crispa, E. B. 2785. Leaves cordate, sessile, or on very short stalks, rugose (wrinkled), crisp at the margin, with long pointed teeth, hairy, whorls spiked. Mr. Babington says it may belong to *S. aquatica*. On the banks of Wooler Water, near Haughhead. James Mitchell, R. N.

4*. *M. citrata*, Ehr. Lemon-scented Mint. Stems glabrous, much branched (bushy), two feet high. Leaves ovate, rounded, or slightly cordate at the base, petiolate, petioles ciliate. Flowers in few, oblong, contiguous verticillasters, or lax at the base. Pedicels and calyxes glabrous. From Bentham's *Labiata*. Watery places; rare. In a small ditch or brook, Capel-Carey (Capel Curig), between Llanrost and Llanberris. Mr. Sole.

5. *M. piperita*, Linn. Peppermint. E. B. 687, L. C. 805. Stem glabrous or with only a few hairs, with roundish angles. Leaves oblong-lanceolate, serrated, on short petioles. Flowers in rather dense spikes, interrupted below. Pedicels glabrous. Calyx glandular, tubular, glabrous below, with subulate teeth. Corolla rose-coloured. In a small brook at Giggleswick, Yorkshire. Also in North Wales, between Dinas Mowddwy and Dolgelly. Perennial. September.

A. 14, C. 30. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

6. *M. aquatica*, Linn. *M. hirsuta*, Sm. Water Mint. E. B. 447, L. C. 806. Stems erect, branching, rough, angles acute, sides concave. Leaves ovate, acute toothed, petiolate, rough clusters few; flowers mostly in dense, roundish, terminal heads, with a single false whorl (two axillary clusters) below. Calyx tubular, with subulate-triangular, erect teeth, more or less hairy. Corolla rose-lilac, hairy without, stamens included. Common in ditches and watery places. Perennial. August, September.

Var. *β. glabrescens*. Stem and leaves glabrous. *M. odorata*, Sole. E. B. 1025.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—300 yards. T. 52°—45°.

Var. *γ. M. hirsuta*, Sm. Herbage pale green. Stems stout, leafy, hairy, hairs deflexed. Leaves stalked, ovate, rough on both sides, coarsely toothed. Flowers in axillary, stalked clusters. Calyx very hairy, ribbed and glandular. Corolla pale pink, hairy externally. Stamens much exerted. Smell not agreeable. In ditches, near the ruins of Halesowen Abbey, Shropshire. A more common and hairier form, and with larger verticillasters.

Var. *δ. subspicata*. Hairy, with many and proximate verticillasters.

M. sativa, *M. rubra*, Sm. E. B. 1413, L. C. 807 b. Plant erect, bushy. Stems and branches nearly glabrous, with prominent angles and convex sides. Leaves petioled, ovate, entire and rounded at the base, sharply and rather deeply serrate above, all acute. Clusters of flowers numerous, more or less distant, surmounted by a crown of small barren leaves. Pedicels slender, glabrous; calyx tubular, bell-shaped, fringed on the angles and edges of the triangular teeth. Rivers and ditches. Perennial. September. (See under *M. arvensis*.)

M. acutifolia, Sm. Acute-leaved Mint. E. B. 2415, L. C. 807 d. Stems erect or ascending, with blunt angles and concave sides, glabrous,

reddish(?), branching, leafy. Leaves stalked, not hairy, ovate, acute, entire at the base, sharply and deeply toothed above. Flowers in dense, not distant whorls; pedicels slender, glabrous, not so long as the calyx. Calyx hairy above, with erect teeth, slightly spreading above. Corolla pink, upper lip slightly cleft.

7. *M. arvensis*, Linn. Field Mint. E. B. 2119, L. C. 808. Stems erect, or nearly so, branching, angles blunt, sides flat or convex, hairy. Leaves *ovate*-pointed, upper ones roundish, somewhat cordate at the base. Clusters (false whorls) numerous, axillary, more or less distant, sometimes contiguous near the top, always surmounted with a leafy crown. Calyx *bell-shaped, urceolate*, membranous, with broad, *triangular, short teeth*. Corolla rose-lilac, more or less hairy. Stamens exserted (longer than the corolla). Corn-fields, &c. Perennial. July—September.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—350 yards. T. 52°—43°.

Under *M. arvensis*, Sm., Mr. Bentham places the following varieties:—

Var. *a. sativa*, Linn. E. B. 448. Calyxes nearly cylindrical, on rough pedicels; leaves more or less hairy. Bentham enumerates thirty synonymes under this variety. (See above.)

Var. *γ. rubra*. Pedicels glabrous; leaves glabrous, reddish.

Var. *δ. vulgaris*. Calyx hairy, campanulate; pedicels glabrous; stem and leaves hairy. *M. agrestis*. E. B. 2120.

Var. *ε. M. gracilis*, Sole. *M. gentilis*, Sm. E. B. 2118. Stem-leaves, pedicels, and calyx hairy.

Note.—*M. pratensis* or *sativa* or *gracilis* (quocunque nomine gaudeat) is queried (see No. 4) with the view of expressing its rather close relationship to *M. arvensis*. The sole difference between the two plants (No. 4 and No. 7) is in the shape of the leaves. The stem, the inflorescence, the extruded (exserted) stamens, &c., agree to a tittle in both. In *M. arvensis* the leaves are broader and more rounded at the base than in *M. pratensis*, in which the leaves taper at the base; also the calyx teeth in *M. pratensis* are somewhat narrower than in *M. arvensis*. The sepals are affected by the same law of development which determines the shape of the leaves. There remains only as the sole distinctive mark: calyx of the fruit in *M. arvensis* *campanulate-urceolate* (campanulé-urceolé), and the same tubular-campanulate (tubuleux-campanulé) in *M. pratensis*. (Compare Coss and Ger. "Fl. des Environs de Paris," p. 346.)

A. agrestis, Sm. E. B. 2120. Stem erect, obtusely angled, downy, branching above; branches opposite. Leaves lanceolate, cordate at the base, strongly, irregularly and laxly toothed, acuminate pointed. Flowers in dense, cylindrical, pyramidal spikes, subtended by linear bracts. Calyx cylindrical, hairy, with ciliate teeth. Corolla bluish-white; stamens long. With the foregoing?

8. *M. Pulegium*, Linn. Pennyroyal. E. B. 1105, L. C. 809. Stems prostrate at the base and rooting, ascending, rigid, simple or branching, slightly hairy or downy. Leaves ovate-oblong, laxly crenulate or toothed, attenuated at the base, on short petioles or almost

sessile. Heads numerous, distant, leafy, usually with the flowers reflexed. Calyx tubular, campanulate, ribbed, with triangular acuminate teeth, hairy. Corolla rosy, rarely white, upper lip usually entire. Much smaller than the other Mints, and distinguished by a strong odour. Wet places, on commons. Perennial. August, September.

A. 12, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 50°—47°.

II. **Lycopus**, Linn. Calyx tubular, bell-shaped, with nearly equal teeth. Corolla funnel-shaped, with four nearly equal lobes, the upper lobe larger and notched. Stamens two, by abortion of the upper pair, divergent, with parallel anther-lobes. Carpels smooth, surrounded by a thick border, triangular and truncate at the apex.

L. europæus, Linn. Gipsywort. E. B. 1105, L. C. 801. Stems simple or branching, erect, robust, rigid, angles blunt, sides grooved or furrowed. Leaves on short petioles, ovate-oblong or ovate-lanceolate, deeply toothed, often pinnatifid. Flowers in compact axillary clusters. Calyx-teeth lanceolate-subulate, almost spinous. Corolla white, with a nearly regular five-cleft limb, and rounded spotted lobes. On banks of rivers, ditches, ponds, &c. Perennial. July—September.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

TRIBE II.—**Salviæ**. Corolla two-lipped. Stamens two, fertile; anther-lobes separated by a very long filiform connective; lower lobe rudimentary or absent.

Genus.—*Salvia*.

III. **Salvia**, Linn. Sage or Clary. Perennial plants, with stout stems and distant opposite clusters of blue or roseate or white flowers; sometimes the flowers are contiguous and spiked. Calyx tubular or campanulate, bilabiate, with the upper lip entire or tridentate (with three teeth), and the lower one cleft. Tube of the corolla included or exserted (longer than the calyx-tube), upper lip entire or notched, helmet-shaped; lower lip three-lobed. Two upper stamens rudimentary or obsolete; two lower with short filaments, with a long connective, which is joined to the filament, and bears the fertile anther-lobe. Carpels ovate-triangular. The stout, erect, branching stems, the large wrinkled crenate or serrate leaves, the arching upper lip of the corolla, and especially the two-branched stamens, with an anther on one of the branches, characterize this genus.

1. **S. pratensis**, Linn. Meadow Clary. E. B. 153, L. C. 800. Stem downy, glandular, especially at the top, simple or branching above, two-three feet high. Leaves ovate or oblong, the root-leaves very large, on long petioles, somewhat cordate at the base, doubly crenate, wrinkled, and wavy. Stem-leaves smaller, sessile, or on short stalks, toothed. Clusters slightly distant; bracts ovate, pointed, with reflexed margins. Calyx hairy, viscid. Upper lip *with three very short teeth*. Corolla large, blue, *much longer than the calyx*; upper lip compressed, arched, longer than the lower. Style *much longer*

than the upper lip of the corolla. Meadows, banks, &c. Cobham Park, near Cuxton, Kent. Perennial. June.

A. 1, C. 2. Lat. 51° — 52° . Alt. 0—50 yards. T. 49° — 48° .

2. *S. verbenaca*, Linn. Wild Clary. E. B. 154, L. C. 799. Stems as in the preceding species. Leaves ovate, more deeply crenulate or cut. Clusters in lax spikes. Upper lip of the calyx almost entire, or slightly toothed. Corolla small, blue, scarcely longer than the calyx. Style scarcely longer than the upper lip of the corolla. Fruit larger than in *S. pratensis*, and finely tubercled. In *S. pratensis* the fruit is smooth and shining. Dry pastures, banks. Perennial. June.

A. 14, C. 40. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

The following characters are from Bentham's "Labiatae," p. 241:—

"*S. verbenaca*. Foliis lato-ovatis oblongisve, crenatis rugosis glabris superioribus latioribus sessilibus basi cordatis. Corolla 1-2 longior calyce.

"Var. γ *incisa*. Foliis lato-ovatis incisiss lobis ovatis acutis approximatis. This has the greatest affinity to *S. clandestina*. Cui forsitan referenda.

"*S. clandestina*. Foliis oblongo-inciso dentatis pinnatifidisve rugosis. Corolla duplo longior calyce." Perennial. July. Lizard Point, Cornwall. This differs from *S. verbenaca* in its narrower, more dissected leaves, lower stature, shorter, denser spikes, and larger flowers; the leaves are generally collected near the bottom of the stem, and the racemes occupy more than half its height. Mr. Babington hints "that it is probably distinct from *S. verbenaca*, but very difficult to distinguish on paper" (herbarium specimens).

S. viridis, Linn. A species, at home in Greece and in the south of Europe generally, occurred very sparingly at Wandsworth, in the station so often quoted as abounding in stray waifs from distant countries.

TRIBE III.—**Thymoidæ**. Corolla two-lipped. Stamens four, distant, straight, or more or less curved and connivent, nearly equal, or the lower pair a little longer than the upper pair.

SUB-TRIBE I.—**Thymoidæ veræ**. Stamens straight, diverging.

Genera.—*Origanum*, *Thymus*.

SYNOPSIS OF THE GENERA.

Origanum. Stems erect, herbaceous; flowers bracteate, in compact, oblong, sub-quadrangular spikelets.

Thymus. Stems procumbent ligneous; flowers capitate or spicate.

IV. **Origanum**, Linn. Marjoram. Herbaceous or sometimes shrubby plants. Stems upright, leafy, with erect branches. Leaves ovate, stalked. Flowers racemose, copious, subtended by a coloured involucre, which forms a four-angled spurious catkin. Calyx variable,

tubular, one- or two-lipped. Corolla ringent, tube a little compressed; upper lip erect, slightly notched; lower in three deep equal lobes. Stamens longer than the corolla. Carpels ovate-roundish.

O. vulgare, Linn. Common Marjoram. E. B. 1143, L. C. 811. Root creeping. Stems erect, rigid, tapering, branching above, hairy or downy, reddish, with blunt angles and rounded sides. Leaves ovate, obscurely toothed, downy or hairy, petioled. Bracts ovate, coloured (reddish-purple). Flowers in panicle cymes. Dry banks, hedges, bushy places, &c. Perennial. July—September.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

V. Thymus, Linn. Thyme. Perennial, somewhat shrubby plants. Flowers rosy or purple, rarely white, in heads or terminal spikes. Calyx tubular, ten-thirteen-nerved, two-lipped; the upper lip three-toothed; the lower one cleft: when in fruit the throat is closed by a ring of hairs. Tube of the corolla only slightly longer than the calyx; upper lip straight, nearly flat, entire or notched, lower lip three-lobed, the middle one the largest. Stamens four, protruded, distant and divergent. Fruit ovate, roundish.

T. Serpyllum, Linn. in part. Wild Thyme. E. B. 1514, L. C. 810. Root creeping, woody, very much branched. Stems numerous, procumbent, shrubby, with short ascending flower-bearing branches, usually downy, reclining and rooting below. Leaves small, glabrous or downy, punctate or glandular beneath, ovate-oblong, rarely linear, petiolate, more or less ciliate. Heads many-flowered, in oblong or interrupted spikes. Teeth of the calyx ciliated; the upper lanceolate, the lower linear-subulate. Odour of the whole plant agreeable. Dry heaths and commons. Perennial. July—October.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1150 yards. T. 52°—35°.

Var. *T. vulgaris*. Cultivated Thyme. Stems erect, woody. Leaves lanceolate, revolute.

Var. *β. nervosus*. Stems prostrate. Leaves very small, glabrous, flat, ciliated below, with prominent nerves. Flowers in globular compact heads. In dry sandy places.

T. Chamædrys, Fr., differs considerably from *T. Serpyllum* in appearance, qualities, and time of flowering.

SUB-TRIBE II.—**Melissineæ**. Stamens more or less bent, connivent (converging).

Genera.—*Calamintha*, *Melissa*.

SYNOPSIS OF THE GENERA.

Calamintha. Lower lip of corolla rather erect; connective of the antherlobes ovate or triangular.

Melissa. Lower lip of corolla spreading; connective of anthers narrow.

VI. **Calamintha**, Moench. Calamint. Perennial or annual plants. Flowers rosy or bluish, rarely white, in opposite, axillary, sessile or pedunculate heads, with few or many bracts. Calyx

tubular or bell-shaped, ten-thirteen-nerved, two-lipped, upper lip three-toothed, lower cleft, throat usually closed with a hairy ring. Corolla two-lipped, its tube usually longer than the calyx; upper lip straight, nearly flat; lower lip spreading, three-lobed, lobes equal or unequal, the central lobe large and notched. Stamens distant, more or less connivent under the upper lip, the lower pair longer than the upper pair (the labial pair longer than the pair on the helmet portion of the corolla); anther-lobes separated by an ovate or triangular connective. Fruit ovate or roundish, smooth.

SECT. I.—*Acinos*. Calyx very gibbous at the base. Flowers on separate pedicels, with few bracts.

1. **C. *Acinos***, Gaud. *Thymus Acinos*, Linn. Basil Thyme. E. B. 411, L. C. 812. Stems erect or ascending, spreading, branching, downy or hairy, six-eight inches high. Leaves small, broadly ovate or oblong, pointed, entire, or slightly toothed, on short petioles, or attenuated into petioles. Flowers axillary, two-three on each side, distant, or in lax leafy spikes. Calyx swollen (gibbous) near the base, with spreading limb; teeth subulate, ciliated; throat closed. Corolla small, reddish blue, its tube much longer than the calyx. Dry sandy or gravelly places; common in chalky or calcareous fields. Annual. July.

A. 15, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

SECT. II.—*Calaminthastrum*. Flowers on common peduncles. Calyx not gibbous, with few bracts.

2. **C. *officinalis***, Moench. Official Calamint. E. B. 1676, L. C. 814. Stems erect or ascending, simple or branching, downy or hairy. Leaves ovate-obtuse, toothed, petiolate, downy beneath. Peduncles axillary three-twelve-flowered. Calyx usually coloured, *tubular, slightly gibbous at or near the base, the teeth furnished with long fringes, the lower teeth twice as long as the upper*, the throat bearded. Corolla-tube longer than the calyx-tube. Hedges, bushy places, &c. Perennial. July—September.

A. 12, C. 40. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—48°.

3. **C. *repeta***, Clairv. Lesser Calamint. E. B. 1414, L. C. 813. Stems ascending or erect, hairy, branching, wiry and rigid. Leaves *small, ovate, blunt, entire or slightly toothed, hairy, especially below*, on short stalks (intensely green on the upper side, often hoary below). Clusters of flowers elongate, three-fifteen, on a common peduncle, with minute oblong bracts, many abortive. Calyx ovate, tubular, *with nearly equal ciliated teeth*. Corolla small, rosy, *tube not longer than the calyx*. Dry stony places. Perennial. July—September. It is very abundant in a field near Grays, Essex; also about Hadleigh Castle, in the same county. Sir J. E. Smith, who evidently knew these forms or species accurately, says, "Eng. Fl.," vol. iii., p. 111, "Rather smaller in every part than the last, especially the leaves, which nevertheless are more strongly serrated. The flower-stalks are more compound, much longer than the adjoining leaves."

The gibbous calyx, paler flowers on longer spikes, and the characters above quoted, will generally suffice to distinguish this from its allied species.

A. 11, C. 25. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—48°.

4. **C. *sylvatica***, Bromf. E. B. 2897, L. C. 814*. Stems erect, branching, downy; branches spreading. Leaves petioled, ovate, tapering at the base, laxly toothed. Flowers axillary on longish, mostly unilateral, horizontally spreading, branched peduncles; pedicels scarcely so long as the calyx. Calyx ovate, ribbed, with short setaceous teeth. Tube and throat of the corolla hairy; upper lip erect, flat, notched; lower lip about equally three-lobed, whitish, with violet-lilac spots. Discovered by the late Dr. Bromfield, on Ape Downs, near Carisbrook, Isle of Wight. Perennial. July—September.

A. 1, C. 1. Lat. 50°—51°. Alt. 0—50 yards. T. 50°.

SECT. III.—Flowers on branched pedicels, with many bracts.

5. **C. *Clinopodium***, Spen. Wild Basil. E. B. 1401, L. C. 815. Root creeping. Stems erect or ascending, diffuse, simple or branching, one-two feet high. Leaves ovate or oblong-lanceolate, laxly toothed, often with the margin entire, hairy, petioled. Bracts rigid, setaceous, with long fringes. Peduncles axillary, very short, many-flowered. Flowers in compact clusters. Calyx two-lipped, strongly ribbed, slightly gibbous at the base, curved; teeth hairy and ciliated, the lower subulate, longer than the upper. Tube of the corolla longer than that of the calyx. Anther-lobes separated by an ovate, or almost angular connective. In open places, in woods, banks, hedges, and bushy dry places. Perennial. July—October.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—350 yards. T. 52°—43°.

Note.—Mr. Bentham, in his excellent work on the *Labiata*æ, unites the genera *Acinos*, *Clinopodium*, and *Calamintha* with *Melissa*.

VII. **Melissa**, Linn. in part. Balm. Flowers in axillary, opposite clusters, white. Calyx tubular or tubular-campanulate; upper lip three-toothed, lower lip cleft. Tube of the corolla longer than the calyx-tube, upper lip erect, almost flat, or slightly concave, notched; lower lip three-lobed, spreading. Stamens four, distant, more or less contiguous under the upper lip. *Connective of the anthers straight*.

M. *officinalis*, Linn. Common Balm Wood. "Med. Bot.," vol. ii., p. 119, L. C. 816. Stems rigid, ascending, hairy or downy, branching, angles blunt. Leaves ovate, tapering below, on longish petioles, wrinkled, hairy, toothed. Clusters distant, with a few oblong hairy bracts. Calyx large; upper lip truncate, three-toothed; lower lip cleft; segments lanceolate, ending in a sharp point. Upper lip of the corolla arched, cleft; lower lip three-cleft, mid-lobe round. Fruit oblong, shining. Naturalized in the south of England. Perennial. August. Near Betchworth, Surrey. Little Chelsea and Parson's Green, Middlesex.

A. 4. Alien.

TRIBE IV.—**Lamioideæ**. Corolla two-lipped. Stamens four, contiguous and parallel under the upper lip of the corolla, sometimes projecting beyond the lip after the emission of the pollen.

SUB-TRIBE I.—**Nepeteæ**. Calyx tubular; stamens on the lip shorter than the stamens on the helmet (two upper united petals).

Genera.—*Nepeta*, *Glechoma*.

SYNOPSIS OF THE GENERA.

Nepeta. Stems erect; flowers numerous, in spicate leafy clusters.

Glechoma. Stems trailing; clusters few-flowered, opposite or alternate.

VIII. **Nepeta**, Linn. Catmint. Perennial, downy, or hairy herbs, more or less odoriferous. Leaves serrate or crenate. Flowers axillary and terminal. Calyx cylindrical, ribbed, with five acute unequal teeth. Corolla ringent, with a long tube dilated upwards. Upper lip erect, roundish, slightly cloven: lower rounded, spreading, three-lobed, the central lobe large and spreading.

N. cataria, Linn. Catmint. E. B. 137, L. C. 842. Stems erect, simple, branching above, finely downy. Leaves cordate at the base, strongly and equally toothed, acuminate, whitish. Heads dense, almost sessile, on branching axillary peduncles, the upper spike-like. Calyx densely woolly. Upper lip of the corolla slightly notched; lower lip deeply and regularly toothed. Fruit smooth. Banks, on chalky and limestone soils. Perennial. July.

A. 14, C. 40. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

IX. **Glechoma**, Linn. Herbaceous, procumbent, perennial plants, with blue or rose-coloured flowers in few-flowered, opposite, or alternate axillary clusters. Calyx tubular, thirteen-fifteen-nerved, with five slightly unequal ciliate teeth. Tube of the corolla longer than the calyx, upper lip flat, erect, notched or cleft, lower lip spreading, with three distinct lobes, the mid-lobe larger than the lateral ones. Stamens approximate under the upper lip; the two lower stamens shorter than the two upper ones; lobes of the anthers divergent, cruciate. Carpels ovate, finely punctate. The sole British species is known by its procumbent, straggling, leafy stems, its reniform, crenate leaves and axillary flowers.

G. hederacea, Linn. Ground Ivy. E. B. 853, L. C. 841. Stems slender, prostrate, rooting, pubescent or hairy, erect above, throwing out many rooting shoots. Leaves reniform-roundish, deeply crenate, on long stalks, with large crenulations, clusters on short pedicels, one-four-flowered (often one-flowered). Hedges and shady places. Perennial. March—June.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

SUB-TRIBE II.—**Stachydeæ**. Calyx tubular or bell-shaped, rarely two-lipped. Stamens on the lip longer than those on the helmet.

Genera.—*Melittis*, *Lamium*, *Galeopsis*, *Stachys*, *Marrubium*, *Balota*, *Leonurus*.

SYNOPSIS OF THE GENERA.

Melittis. Flowers very large, solitary or in pairs.

Lamium. Annual or perennial. Stems succulent, hollow. Flowers numerous, in axillary opposite clusters.

Galeopsis. Annual plants, with rigid hairy stems; throat of corolla dilated, upper lip helmet-like.

Stachys is distinguished from *Galeopsis* by its more erect and less branching stems, and by the upper lip of the corolla, which is flat or arched.

Marrubium. Calyx-throat furnished with a hairy ring. Upper lip of corolla erect, flat, lower lip spreading. Stamens included.

Ballota. Calyx plaited; stamens surpassing the tube. Anthers with divergent lobes.

Leonurus. Teeth of calyx unequal; tube of corolla curved.

X. *Melittis*, Linn. Bastard Balm. Stems simple, leafy, erect. Leaves stalked, ovate, serrated. Flowers large, axillary. Calyx campanulate, large, angular, two-lipped, with three-four broad lobes. Corollaringent, with the tube much narrower and longer than the calyx; upper lip erect, rounded, entire, slightly concave; lower lip spreading, consisting of three rounded equal lobes, the middle largest and obcordate. Carpels downy, oval, small. These plants are distinguished by their erect, not branching, stems, by their ovate leaves, and by their large handsome flowers.

M. *Melissophyllum*, Linn. Bastard Balm. E. B. 577, L. C. 817. (See Fig. 153.) Stems erect, robust, simple, rarely branching, hairy or downy; when glabrous there are tufts of hairs at the base of the petioles. Leaves large, downy, or glabrous, ovate-acute, petiolate, sometimes cordate at the base, toothed or crenulate. In woods and copses, very rare. Perennial. May—July.

A. 4, C. 8. Lat. 50°—53°. Alt. 0—100 yards. T. 51°—49°.

XI. *Lamium*, Linn. Archangel Dead Nettle. Annual or perennial plants, with succulent stems, which are mostly winged or with acute prominent angles. Flowers in axillary clusters (glomerules). Calyx tubular-campanulate, five-toothed, five-ten-nerved. Corolla erect or ascending, tube longer than the calyx; upper lip oblong or obovate, entire, contracted at the base, concave or helmet-shaped, lower lip obscurely three-lobed, lateral lobes truncate or almost none, decreasing into one-two pointed teeth, middle lobe obcordate, cleft, narrower at the base. Stamens contiguous and parallel under the upper lip, not extended after the pollen is shed, the two lower longest; anthers bearded, rarely smooth, in pairs. Carpels (fruit) three-sided, with sharp angles smooth, or finely wrinkled. The cordate, toothed, or scalloped leaves, and the ringent (gaping) corollas obviously distinguish this genus from the allied genera.

SECT. I.—Plants annual; tube of the corolla erect, with a very wide throat.

1. **L. *amplexicaule***, Linn. Henbit. E. B. 770, L. C. 830.

Stems diffuse, ascending, not hollow, almost smooth, with long internodes (space between the joints or leaves of the stem). Leaves roundish, reniform, incised-crenate, hairy; the lower leaves small, on longish stalks, the upper quite sessile, embracing the stem. Calyx hairy, with equal, linear, pointed teeth. Corolla with a long slender tube, and with a deep purple velvety upper lip; lower lip whitish, with deep purple spots. Carpels prismatic, convex on the outer face, flat on the two inner ones, quite smooth and shining. Fields, waysides; rubbish. Annual. April, May.

A. 18, C. 80. Lat. 50° — 59° . Alt. 0—200 yards. T. 52° — 46° .

2. **L. intermedium**, Fr. Intermediate Henbit. E. B. 2914, L. C. 830*. Stem rough, with short prickles, branching, with long internodes. Leaves reniform or broadly cordate, incised, with broad, roundish lobes. Calyx-teeth *considerably longer than the tube*, rough, spreading, strongly ribbed, and much hairier than in No. 1. Tube of the corolla equal, cylindrical, with a faint hairy ring within. Middle lobe blunt, carpels (nuts) oblong, larger than the fruit of *L. amplexicaule*, and longer, but not broader than that of *L. purpureum*. Rubbish, &c. In Scotland and Ireland. Annual. June—September.

A. 6, C. 20. Lat. 54° — 61° . Alt. 0—200 yards. T. 48° — 45° .

3. **L. incisum**, Willd. Cut-leaved Dead Nettle. E. B. 1933, L. C. 831 b, *incisum*. Stems diffuse, stout, slightly hollow, obtusely angular, not winged, almost glabrous. Leaves ovate-triangular, somewhat reniform, cordate and wedge-shaped at the base, tapering into the petiole, *rather deeply incised*, with crenulate, toothed, or entire lobes and prominent nerves beneath, all on rather short stalks. Teeth of the calyx tapering, subulate only at the points, scarcely ciliated, *spreading after flowering*. Corolla small, purple, usually somewhat longer than the calyx, *without the hairy ring at or near the base of the tube* as in the following. Carpels finely dotted, without any rim on the summit. This species is chiefly distinguished from *L. purpureum* by its more solid stem, more dilated leaves, and by the open tube of the corolla. On rubbish, much less common than the following. Annual. April.

4. **L. purpureum**, Linn. Red Henbit. E. B. 769, L. C. 831. Stem rather succulent, hollow, with prominent angles, simple or branching at the base, smooth, with a long internode, nearly glabrous. Leaves cordate-triangular (ovate or triangular), obtuse, unequally *crenated or toothed*, more or less wrinkled, the lower on long petioles, upper on short ones or nearly sessile, with more or less of a reddish tinge. Calyx-teeth nearly equal, divergent, pubescent, subulate, ciliate. Corolla purple (rarely white), small, with a circle of hairs near the bottom of the tube, upper lip ovate entire, velvety, mid-lobe of the lower lip flat. Carpels quite smooth, with a marginal, slightly elevated rim at the apex. On rubbish. Annual. March—October.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—350 yards. T. 52° — 43° .

5. **L. album**, Linn. White Dead Nettle. E. B. 768, L. C. 828. Stems reclining at the base, thin, erect, branching, more or less pubescent. Leaves ovate-acuminate, cordate at the base, petioled,

lower, crenate-toothed, the upper incised and toothed. Flowers in clusters four-ten. Calyx ribbed and furrowed, hairy, with hairy, ciliated spreading, acuminate, nearly equal teeth; teeth very divergent after flowering. Corolla large, white, with a long bulging tube abruptly contracted below the ring of hairs. Upper lip elongated, vaulted, densely hairy. Lower lip with a crenate central lobe and two lateral lobes, each bearing a more or less subulate lateral tooth. Anthers black. Hedges, grassy places, near villages, waysides, &c. Perennial. March, April.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

A variety, with enlarged lateral lobes (a sort of cruciate flower)—(see "Bot. Gaz." vol. iii., p. 2, No. 25)—was gathered in Battersea Fields.

SECT. II.—Plants perennial.

6. **L. maculatum**, Linn. Spotted-leaved Dead Nettle. E. B. 2550, L. C. 829. Stems erect or ascending, diffuse, usually curved, simple or branched at the base, hairy or downy, rarely glabrous. Leaves ovate-acuminate, cordate at the base, all stalked, unequally toothed, wrinkled, often marked on the upper side with a long whitish patch. Flowers large, in clusters of three-five. Calyx pubescent, with unequal, subulate teeth, ciliated, divergent after flowering. Tube of the corolla inflated, bent, much contracted at the base, furnished with glandular hairs; upper lip arched and concave, toothed or ciliate; lower lip with somewhat divergent lobes and with two subulate teeth. Scotland; rare. Perennial. June.

A. 8. Alien.

This plant is well established near Ryde, under a hedge by a path which leads from St. John's to Upton.

7. **L. Galeobdolon**, Crantz. *Galeobdolon luteum*, Sm. Yellow Archangel. E. B. 787, L. C. 827. Root creeping widely, with long radical fibres. Stems reclining at the base, thence erect, mostly simple or branching only at the base and summit, downy, usually accompanied with several barren shoots. Leaves petiolate, ovate, or slightly cordate at the base, tapering, coarsely serrate; upper leaves lanceolate, all more or less wrinkled and hairy. Calyx slightly hairy, with triangular, spreading teeth, ending in spinous points, when in fruit very divergent. Corolla large, yellow, upper lip oblong-elongated, lower lip three-parted, with equal lobes. Woods and hedges. Perennial. May.

Note.—This species agrees with the species of *Lamium* in all its characters except the colour of the flowers, which is yellow, and in the nearly equally divided lower lip of the corolla. The plant is rather more rigid and robust than the British species of *Lamium*.

A. 11, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—48°.

XII. Galeopsis, Linn. Hemp Nettle. Annual hairy or downy plants, with white or purple or reddish flowers, which are arranged in axillary opposite clusters. Stems upright, branched. Leaves stalked, ovate or lanceolate, serrate. Flowers large, party-coloured. Calyx

tubular, campanulate, with spreading, spinous teeth. Corolla ringent (gaping), tube slender, throat dilated, with two prominences in the palate, terminating in two conical teeth; upper lip arched, rounded, and serrated, lower three-lobed, the central lobe cleft and notched. Stamens contiguous, parallel, the two lower ones longer than the two upper. Carpels obovate, compressed, triangular at the base, convex at the summit, almost smooth. The horizontally branched stems, the hairy leaves, the spinous, widely-spreading calyx-teeth, and the variegated showy flowers will help to identify this genus.

1. **G. Tetrahit**, Linn. Common Hemp Nettle. E. B. 207, L. C. 834. Stem hispid, enlarged below the joints, hairs deflexed. Leaves ovate or oblong, acuminate, serrate. Calyx campanulate, with *long spinous spreading teeth*, teeth and margin ciliated. Tube of *corolla elongate*, slender, slightly constricted at the throat; upper lip entire or slightly notched, rounded and concave; lower lip three-lobed, lobes nearly equal, the lateral lobes deflected. Corolla about twice as long as the calyx, upper lip nearly straight. Nuts (carpels) light green, obovate, with slightly compressed margins. The flowers are either variegated or white, or purplish, and variously dappled with white spots.

^ Var. *bifida*, Boening. Stem slenderer than in the typical form. Leaves ovate, shortly acuminate, with very blunt teeth. Flowers small, roseate; upper lip cleft; mid-lobe of lower lip oblong, entire, or slightly notched, with two yellow prominent spots (ridges) close to the throat. Wandsworth steam-boat pier. Annual. July, August.

2. **G. versicolor**, Curt. Large-flowered Hemp Nettle. E. B. 667, L. C. 835. Stem erect, stout, hairy; hairs deflexed. Branches spreading, leafy. Leaves ovate or cordate, wrinkled, rough, coarsely toothed; upper leaves roundish, cordate at the base, smoother. Flowers sessile, axillary. Calyx ribbed, with spreading spinous teeth, sometimes with an intermediate smaller tooth, *about one-third of the length of the corolla*. Lobes of the lower lip of the corolla nearly equal, the middle *one beautifully coloured*, with a notched margin. Corn-fields. Annual. July, August.

A. 16, C. 50. Lat. 51°—58°. Alt. 0—150 yards. T. 49°—45°.

This plant abounds between Killin and Taymouth on the spurs of Ben Lawers; and it probably attains, on some of the cultivated slopes, a higher elevation than that assigned to it in the "Cybele."

3. **G. ochroleuca**, Lam.; *villosa*, Huds and Smith. Hairy Hemp Nettle. E. B. 2353, L. C. 833. Stem taller than in the foregoing. Leaves *ovate*, clothed with soft down. Calyx *densely shaggy*. Corolla large, pale, sulphur-coloured, with a yellow palate and bluish upper lip (Sm.) In sandy corn-fields, Essex, North Wales, North of England, &c. Annual. July, August.

A. 6, C. 6. Lat. 51°—55°. Alt. 0—100 yards. T. 49°—48°.

4. **G. Ladanum**, Linn. Red Hemp Nettle. E. B. 884, L. C. 832. Stems erect, rigid, branching, finely and densely downy, *not swollen at the articulations*; branches spreading, sometimes very widely so. Leaves lanceolate, tapering both ways, with prominent nerves and

Galeopsis ochroleuca
raised here hortum meo - ex seminebus
normandicibus - July 1860

Stem with rounded corners & deflexed
hairs. Leaves lapping at the base lanceolate
or ovate-lanceolate with short hairs
calyx with short spreading teeth, hairy
glandular. Corolla white, with a yellow
throat - upper lip deeply notched -
lobes toothed, lobes of lower lip large
crenated or toothed

Folds & on Rubbed

lax teeth. Calyx downy or hairy, hairs appressed; teeth spreading, subulate, and prickly. Corolla *rosy, purplish*, tube longer than the calyx, *spotted*, the mid-lobe of the lower lip *with two white spots*. This beautiful and conspicuous plant adorns the stubble-fields in the chalky, calcareous, and gravelly soils in the south and centre of England. Annual. August, September.

A. 12, C. 40. Lat. 50° — 58° . Alt. 0—200 yards. T. 51° — 47° .

Var. β . *angustifolia*. Leaves linear.

Var. γ . *latifolia*. Leaves ovate.

Sub-var. *parviflora*. Flowers small.

Sub-var. *canescens*. Whole plant hoary.

XIII. Stachys, Linn. Woundwort. Perennial, rarely annual, herbaceous, sometimes shrubby plants, with hairy, shaggy, or woolly herbage. Stems erect, seldom branching, always leafy. Leaves cordate, ovate, or oblong, serrate or crenate. Inflorescence in numerous axillary leafy or bracteate racemes. Calyx tubular-campanulate, angular, with ten ribs, and five spreading, spinous-pointed, almost equal teeth. Corolla ringent, tube short, throat oblong and protuberant at the base. Upper lip erect, ovate, arched; lower lip spreading, three-lobed, the middle one large, the lateral one smaller and reflexed. Stamens four, contiguous, and parallel under the upper lip of the corolla. Carpels obovate or oblong-obovate, glabrous, angular, abrupt. The simple upright stems, and the cordate or lanceolate leaves, with the long spike-like inflorescence, distinguish this genus.

1. **S. Betonica**, Benth. Wood Betony. E. B. 1142, L. C. 836. Stems erect, rigid, hairy, simple, *not leafy*. Root-leaves on long petioles, oblong or oblong-lanceolate, cordate at the base, blunt, deeply and regularly crenate, usually more or less hairy. Stem-leaves sessile, *usually two, situated above the middle of the stem*. Clusters of flowers in an oblong spike, interrupted at the base. Calyx with triangular or lanceolate, very sharp, spinous teeth. Corolla purple, with a long tube. Mid-lobe of the lower lip toothed, broad, rounded; lateral lobes entire, ovate. Woods and bushy places. Perennial. July.

A. 16, C. 60. Lat. 50° — 57° . Alt. 0—200 yards. T. 52° — 47° .

2. **S. germanica**, Linn. Woolly or Downy Woundwort. E. B. 829, L. C. 839. Whole of the plant *woolly or silky, hoary*. Stem erect or slightly reclining at the base, with sharp angles and concave sides, stout, simple or branching above. Leaves ovate-lanceolate, the lower petioled, the upper sessile, *thick and soft*. Flowers in compact clusters, forming an interrupted, more or less dense, leafy spike. Calyx-teeth ovate, pointed (mucronate), pricking; throat of the calyx furnished with a ring of hairs. Corolla purplish, with an inner ring of hairs in the tube, and with a *hairy-woolly upper lip*. Chalky soil. Perennial. July, August.

A. 4, C. 5. Lat. 54° — 55° (51° — 54°). Berks—York. Alt. 0—100 yards. T. 49° — 48° .

2*. **S. sylvatica**, Linn. Hedge Woundwort. E. B. 416, L. C. 838. The whole plant when handled emits a very disagreeable smell.

Root long, creeping. Stems erect, simple, rarely branched, hairy. Leaves *ovate, pointed*, strongly toothed, *on long petioles*, large, soft, the lower ones cordate at the base. Flowers in three-seven-flowered clusters, distant or contiguous. Calyx-teeth lanceolate, pricking. Corolla much longer than the calyx, dark purple, *throat spotted with white*. Shady places. Perennial. June, July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—43°.

3. ***S. palustris***, Linn. Marsh Woundwort. E. B. 1675, L. C. 837. Root *fleshy*, creeping extensively. Stems quite erect, slightly branched, with deflexed bristly hairs, leafy. Leaves *elongated, lanceolate*, or oblong-lanceolate, sessile, the upper leaves half *embracing the stem with their rounded bases*. Flowers in a lax terminal spike, consisting of many whorls, each subtended by a couple of deflexed leaves. Calyx-teeth subulate, pungent. Corolla purple, variegated with white spots. Roadsides and wet places; common. Perennial. August.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

Var. *S. ambigua*, Sm. Doubtful Marsh Woundwort. E. B. 2089, L. C. 837 b. Stem acutely angular, with concave or grooved sides, hairy, leafy, and branching; branches spreading. Leaves nearly sessile, or on very short pedicels, ovate or slightly cordate at the base, lanceolate, regularly and sharply toothed, soft and downy. Flowers whorled, five or six in each whorl, in terminal or lateral spikes, sessile. Calyx spreading, with triangular short teeth. Upper lip of the corolla hairy, lower in three equal lobes, mid-lobe notched.

I have never collected any form of the above which might not be referred to *S. palustris*.—A. I.

4. ***S. arvensis***, Linn. Field or Corn Woundwort. E. B. 1154, L. C. 840. Stem weak or slender, branching from the base, hairy, with ascending branches. Leaves ovate or ovate-oblong, slightly cordate at the base, obtuse, crenate, or dentate, the lower petiolate, the upper sessile, the uppermost or floral leaves (bracts) ending in a *prickly point*. Clusters axillary, either distant or in a close leafy spike, *one-three-flowered*. Teeth of the calyx ending in a short prickly point. Corolla *rather longer than the calyx*, reddish, spotted with purple. Cornfields. Annual. July—October.

A. 17, C. 75. Lat. 50°—59°. Alt. 0—200 yards. T. 52°—46°.

S. annua, Linn. Annual Woundwort. E. B. 2669, L. C. Excluded Species, List C. Stem erect, downy, with opposite spreading branches. Leaves oblong, lanceolate, slightly downy, the lower tapering at the base, and petioled, the upper ones sessile and entire (?). Flowers yellow, about six in a whorl. Calyx hairy, with subulate segments. Upper lip of corolla with a crisp margin, lower one with three rounded lobes. Seeds roundish, smooth, glossy, black. Field between Gads-hill and Rochester. Mr. J. Woods, 1830. Cobham, Mr. Salmon. Alien.

XIV. ***Marrubium***, Linn. White Horehound. Downy or woolly, branching herbs. Leaves bluntly serrated. Flowers small white, in dense racemes. Calyx tubular, ovate-cylindrical, ten-ribbed,

S. palustris 587.

with five-ten spreading, linear or setaceous teeth. Corolla ringent, tubular, with an elongated open throat; upper lip erect, linear, cleft; lower lip three-lobed, the middle lobe broader and cleft, the two lateral lobes acute, sometimes abortive. Stamens included. Carpels four, elliptic, oblong, smooth. The rigid, woolly, or hairy stems, and the dense clusters of flowers, distinguish this genus.

M. vulgare, Linn. Common Horehound. E. B. 416, L. C. 843. Stems erect, stout, densely shaggy, white, branching. Leaves deeply wrinkled, ovate-roundish, unequally crenate, petioled, mostly cuneate at the base, downy or hairy on both sides. Clusters very dense, nearly globular, with subulate bracts. Calyx hairy or woolly, ridged, with about ten subulate hooked teeth (when mature). Upper lip of the corolla cleft; lobes contiguous and parallel. Commons and similar waste places. Perennial. July.

A. 13, C. 40. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

XV. Ballota, Linn. Black Horehound. Downy or hairy foetid herbs. Leaves ovate or cordate, serrated or lobed. Flowers in dense, axillary, bracteate racemes. Calyx tubular, five-angled, ten-ribbed, with five equal, acute teeth. Corolla ringent, with a cylindrical tube; upper lip erect, concave, notched; lower lip three-lobed, spreading, the middle lobe notched. Stamens four, contiguous and parallel, the two lower longer than the two upper (those on the lip longer than those on the helmet). Carpels ovate-oblong, glabrous. The stout, upright, leafy stem, with perennial root, the ovate or slightly cordate leaves, and the dense axillary clusters, subtended by bristle-shaped bracts, identify this genus.

B. foetida, Lam. *B. nigra*, Linn. Stinking Horehound. E. B. 46, L. C. 825. Stems erect or ascending, branching, with blunt(?) angles, woolly or hairy. Leaves wrinkled, petioled, ovate or ovate-roundish, slightly cordate at the base, unequally crenate. Calyx downy, with prominent nerves; limb large, more or less plicate; teeth short, ovate or triangular, ending abruptly in a long point. Waysides. Perennial. July.

A. 14, C. 50. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—47°.

Var. *ruderalis* (?). Stem bluntly angled, furrowed, soft, woolly. Leaves light green, limp, very slightly wrinkled, with large, round, very unequal, mucronate teeth. Bracts setaceous. Calyx elongated, with broad, rounded, short and pointed teeth. Upper lip of the corolla toothed and hairy on both sides; lateral lobes of the lower lip acutely toothed.

XVI. Leonurus, Linn. Motherwort. Erect, smooth or downy herbs. Leaves stalked, lobed, or cut. Flowers numerous, in axillary racemes. Calyx tubular, five-angled and five-toothed. Corolla ringent, tube short, cylindrical, narrow; throat longish, but little dilated; limb spreading; upper lip entire, hairy above; lower lip spreading, three-cleft, lobes lanceolate, nearly equal, oblong, obtuse,

the central lobe revolute or reflexed after fecundation. Carpels hairy at the top, three-angled, oblong, truncate.

L. Cardiaca, Linn. Motherwort. E. B. 273, L. C. 826. Stems erect, stout, branching, with prominent downy angles. Leaves petioled, deep (dark) green above, pale (light) green beneath; the lower leaves large, deeply three-lobed; lobes oblong-triangular, lanceolate, unequally incised or toothed; upper leaves attenuated at the base into petioles, three-toothed at the apex, the middle tooth the largest. Flowers numerous, in lax, leafy, very long spikes. Calyx-teeth triangular, ending in strong spinous points, very divergent when in fruit. Upper lip of the corolla densely hairy on the outside, lip spotted with purple. Waysides near villages; very rare. Perennial. July. Little London, a hamlet in Albury parish, near Guildford, in 1837.—A. I. Near Bewdley, Worcestershire. Mr. Jordan.

A. 12, C. 30. Lat. 50° — 56° . Alt. 0—200 yards. T. 52° — 47° .

SUB-TRIBE III.—**Scutellarineæ**. Calyx two-lipped, depressed, and shut when ripe by the converging of the two lips. Labial stamens longer than the other pair.

Genera.—*Prunella*, *Scutellaria*.

SYNOPSIS OF THE GENERA.

Prunella. Stems erect, branching, short; flowers in terminal, dense, spicate clusters. Upper lip of calyx three-toothed.

Scutellaria is distinguished from the above by its curious calyx, which is truncate with a basal appendage; also by its fewer and axillary flowers.

XVII. *Prunella* (*Brunella*), Linn. Self-heal. Perennial plants, with simple stems and ovate leaves, margin variable. Flowers spike-like, dense, bracteate. Calyx two-lipped; upper lip flat, three-toothed; lower lip cleft. Corolla ringent; upper lip concave, inflexed, entire; lower lip in three round crenate lobes, the central one largest. Filaments toothed below the anthers. Carpels oval. Stems rarely above eight or nine inches high, branched near the root; flowers in dense terminal spikes. The herbage is not aromatic.

P. vulgaris, Linn. All-heal. E. B. 961, L. C. 844. Stems solitary or few, reclining, and often rooting at the base, simple, rarely branched, channelled on two sides, the two other sides convex. Leaves petioled, ovate or oblong, entire or toothed, or lobed. Calyx coloured, glabrous or slightly hairy, two-lipped; *upper lip with three very short setaceous teeth*, truncate, lower lip with two linear lanceolate teeth. Corolla twice as long as the calyx, violet, upper lip concave, hairy outside. Pastures and grassy places. Perennial. July.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—750 yards. T. 52° — 39° .

Var. *a. vulgaris*. Leaves entire, sinuate, or toothed.

Sub-var. *β. pinnatifida*. Leaves pinnatifid or cleft.

XVIII. *Scutellaria*, Linn. Skull-cap. Perennials, with

creeping roots, and more or less branching, slender stems. Leaves entire or serrated. Flowers axillary or terminal. Calyx tubular, two-lipped, with four equal lobes, and with a horizontal, herbaceous, concave scale, which closes the calyx after flowering. Corolla ringent, tube longer than the calyx, throat compressed below, dilated upwards; upper lip concave in three segments; lower lip broader, in three shallow lobes. Stamens approximate, two lower longer than the two upper. Carpels roundish, or oblong, smooth or tubercled, glabrous or pubescent. The slender more or less branching stems, with axillary flowers, either solitary or in pairs, and especially the peculiar lid of the calyx, when in fruit, characterize this genus.

1. ***S. galericulata***, Linn. Common Skull-cap. E. B. 523, L. C. 845. Stems erect or ascending, bushy (branching), downy or glabrous, leafy. Leaves on short petioles, cordate at the base, oblong-lanceolate, blunt, laxly crenulate or toothed. Flowers axillary, opposite, but turned to one side (unilateral). Calyx *smooth or slightly downy*, with a broad, convex, horizontal spur. Corolla *blue*, with an elongated tube, enlarged above, hairy. About river-sides, ditches, &c. Perennial. July—August.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

2. ***S. minor***, Linn. Lesser Skull-cap. E. B. 524, L. C. 846. Stems slender, erect, or slightly reclining at the base, usually branching; branches erect, downy, especially at the angles. Leaves on short petioles, cordate at the base, slightly hastate, oblong-lanceolate, entire, or with one or two teeth at the base. Flowers solitary, axillary, turned to one side. Calyx *hairy*. Corolla small, *rosy-whitish*, lip spotted with purple. Marshy places in commons and heaths. Perennial. July.

A. 14, C. 40 (50). Lat. 50°—56°. Alt. 0.—200 yards. T. 52°—47°.

Var. *procera*. Stems from one-three feet high, branched, and flowering almost from the base. Leaves all on short petioles, cordate, and with one or two teeth at the base. The calyx and corolla agree with the same parts of the common form. Parkhurst Forest, near Newport. August, 1853.—A. I.

TRIBE V.—**Ajugoidæ**. Corolla apparently one-lipped, the upper lip being either very short or deeply cleft, and a portion adheres to the opposite sides of the lower lip. Stamens approximate and parallel, projecting beyond the corolla, the labial stamens longer than the other pair.

SYNOPSIS OF THE GENERA.

Ajuga. Corolla apparently one-lipped, withering; the tube surpassing the calyx.

Teucrium. Flowers caducous. Tube of corolla short.

XIX. **Ajuga**, Linn. Bugle. Perennial or annual plants, with flowers in axillary clusters, which are arranged in terminal spikes;

sometimes the flowers are axillary and solitary. Calyx ovate at the base, with five equal, or nearly equal teeth. Corolla withering before falling off, apparently one-lipped. Tube longer than the calyx; upper lip *very short*, two-lobed; lower lip large, spreading, three-lobed. Stamens approximate and parallel, much longer than the upper lip of the corolla. Style persistent. Fruit oblong or obovate-roundish, reticulate, wrinkled, glabrous.

1. **A. reptans**, Linn. Common Bugle. E. B. 489, L. C. 822. Root thick, with strong fibres, throwing out long, *often rooting barren shoots*. Flowering stem erect, rarely solitary, six-eight inches high, two opposite sides hairy and two smooth, alternately in the internodes. Leaves oblong or ovate, or spatulate, entire, or faintly crenulate; root-leaves on a long petiole. Stem leaves nearly sessile. Floral leaves (bracts) green or coloured. Flowers usually blue, sometimes red or white, in many-flowered clusters arranged in a terminal, leafy, more or less compact spike. Woods, shady places, and pastures. Perennial. May. June.

A. 18, C. 80. Lat. 50° — 61° . Alt. 0—750 yards. T. 52° — 39° .

The var. *alpina* differs from *A. reptans* in the notched or lobed leaves, and, as it is described, by the absence of scions. In alpine places.

2. **A. pyramidalis**, Linn. Pyramidal Bugle. E. B. 1270, L. C. 823. Stem four-six inches high, *without scions*. Root-leaves *obovate, notched*, stalked; floral leaves (bracts) small, purplish. Calyx-teeth hairy, long. Flowers in crowded whorls. Corolla bluish purple, with a yellow throat; upper lip *with two acute lobes*. Mountainous pastures, Scotland. Perennial. June.

A. 4, C. 7. Lat. 56° — 60° . Alt. 2—500 yards (?). T. 45° — 40° .

3. **A. Chamæpitys**, Schreb. Ground Pine. E. B. 77, L. C. 824. Root fibrous, annual. Stems erect, bushy, branching, leafy. *Leaves three-parted; lobes linear*; lower leaves oblong, attenuated into petioles, entire or three-lobed; all very hairy. Flowers yellow, *solitary, axillary*, almost concealed by the leaves, which far surpass them. Chalky corn-fields. Annual. July.

A. 3, C. 9. Lat. 51° — 53° . Alt. 0—100 yards. T. 50° — 48° .

XX. **Teucrium**, Linn. Germander. Herbs or shrubs, downy or hairy. Leaves serrated or entire. Flowers axillary or capitate. Calyx unequally five-cleft, with a lateral protuberance at the base. Corolla ringent, tube cylindrical, short, curved upwards, upper lip divided to the base, and forming two lateral lobes; lower spreading, three-lobed, the two lateral lobes erect, resembling the lobes of the upper lip, the central one larger, flat or concave. Stamens parallel, between the fissure of the upper lip. Carpels oblong, rounded, wrinkled.

SECT. I.—*Scorodonia*. Flowers in spiked, terminal, slender clusters, bracteate. Calyx apparently two-lipped (upper teeth much developed and distant from the lower teeth).

1. **T. Scorodonia**, Linn. Wood Sage. E. B. 1543, L. C. 818.

Root creeping. Stem erect, *one-two feet* high, leafy, acutely angular. Leaves cordate-lanceolate, wrinkled, serrated, hairy, stalked. Flowers in numerous, terminal and axillary, erect clusters, unilateral. *Upper lip of the calyx entire*, ovate (Babington). Corolla *pale yellow*, middle lobe concave. The smell of the plant resembles that of Hops. In woods and heaths, abundant. Perennial. July—September.

A. 18, C. 81. Lat. 50° — 60° . Alt. 0—400 yards. T. 52° — 43° .

2. **T. Scordium**, Linn. Water Germander. E. B. 828, L. C. 819. Stems *recumbent*, branched. Leaves *oblong, blunt*, downy or hoary, dentate, serrate, sessile. Flowers stalked, two or more together, axillary. Calyx-teeth *broad, short, equal*. Corolla *pale purple*, the middle lobe rounded, flat, with two spots. Wet meadows; rare. Perennial. July, August.

A. 5, C. 7. Lat. 51° — 55° . Alt. 0—50 yards. T. 50° — 48° .

3. **T. Chamædrys**, Linn. Wall Germander. E. B. 680, L. C. 821. Somewhat shrubby plants. Roots woody, branching, widely creeping. Stems more or less woody at the base, round, hairy, reclining below, erect above, very downy. Leaves *wedge-shaped at the base*, tapering into a petiole, deeply toothed, ovate or oblong, lower leaves toothed to the base, upper only at the apex (*nearly entire*). Flowers *rosy or purple*, rarely white, axillary, *solitary or in pairs*, in terminal leafy clusters. Calyx gibbous at the base, with prominent angles and lanceolate-acuminate teeth. Lobes of the upper lip of the corolla acute, ciliated; lower lip with a broad, concave middle lobe; throat strongly-bearded. Carpels nearly smooth. On old walls, &c.; rare. Perennial. July.

A. 10. Alien.

4. **T. botrys**, Linn. Clustered Germander. Nees, Gen. Plant, 6, 45. Stems reclining, erect, angular, hairy, branching, leafy; branches spreading. Leaves *pinnatifid below, three-cleft above*, with cleft or entire blunt lobes, tapering at the base and petioled. Flowers axillary, in several-flowered tufts, on pedicels longer than the calyxes. Calyx remarkably gibbous or inflated and prolonged at the base, with short triangular teeth, hairy. Mid-lobe of the lower lip entire, spreading; two lateral lobes more or less erect, with three sharp teeth, the middle one elongated and sharp-pointed. Reported from the vicinity of Box-hill. Perennial. July.

A. 1, C. 1. Lat. 51° — 52° . Alt. 0—100 yards. T. 50° .

Elsholtzia cristata. Root fibrous, annual (?). Stems bluntly four-angular, rigid, rough, much branched, with opposite, spreading-erect branches. Leaves ovate, ovate-oblong, or ovate-elliptical, tapering at both ends, crenate-dentate, with rounded teeth. Whorls unilateral, with rounded, herbaceous, membranous bracts and a short point, aggregate. A weed, in gardens and on rubbish. Chelsea and Parson's Green. July, August.

This plant appears periodically, but not every year. Last year, 1856, it was plentiful. It has not been observed this season, 1857.

ORDER LVII.—**SCROPHULARIACEÆ**, Br. THE FIGWORT FAMILY.

Herbs, under-shrubs, and sometimes shrubs. Leaves variable, both in structure and position. Flowers axillary or in racemes, rarely spiked. Calyx pentasepalous or tetrasepalous by abortion, sometimes gamosepalous. Corolla deciduous, variable, tubular, with either a regular or bilabiate limb, imbricated in prefloration (æstivation). Stamens two or four, two long and two short (didynamous). Ovary two-celled (dicarpous), many-seeded. Fruit capsular, rarely baccate, dehiscence valvular or by pores. Seeds many. The dicarpous fruit, the two or four stamens, and the personate, ringent, or bilabiate corollas help to distinguish this order. When the corolla has an expanded limb, one lobe is smaller than the others.



Fig. 154.—*Euphrasia officinalis*. 1, Entire flower; 2, pistil; 3, section of the ovary. 4, calyx and fruit; 5, fruit detached; 6, seed; 7, section of the same.

The plants of this order are found in all parts of the world, from the coldest region in which flowering plants exist to the hottest places between the tropics. One species is found in Melville Island. They are common in India, South America, Australia, &c.

SYNOPSIS OF THE GENERA.

Veronica. Annual and perennial plants. Leaves mostly opposite. Flowers rotate. Stamens two. Fruit cordate, turgid, or compressed.

Limosella. A minute aquatic, with radical entire leaves and very inconspicuous flowers.

Scrophularia. Leaves crenate, large. Corolla inflated, tubular, gibbous, with four fertile and one barren stamen.

Digitalis. Stems erect, virgate Flower campanulate-tubular, inflated, obliquely two-lipped.

Antirrhinum. Corolla tubular, inflated, personate. (See Index.)

Linaria. Corolla personate, with a spur.

Pedicularis. Leaves divided. Calyx five-toothed, inflated. Corolla ringent, upper lip arched and compressed.

Rhinanthus. Leaves simple. Calyx inflated, four-toothed.

Melampyrum. Calyx tubular, four-toothed. Capsule few-seeded.

Bartsia. Calyx bell-shaped, four-cleft.

Eufragia. Calyx tubular, four-cleft.

Euphrasia. Calyx four-cleft or four-toothed. Corolla two-lipped.

Sibthorpia. Calyx in five deep and spreading segments.

I. Veronica, Linn. Speedwell. Annual or perennial, herbaceous, rarely shrubby plants. Stems branched, erect, or procumbent. Leaves opposite, rarely whorled. Flowers axillary, alternate. Calyx four-five-parted, segments rather unequal. Corolla rotate, deciduous, four-cleft, lower lobe the smallest, the upper largest. Stamens two. Ovary compressed. Style as long as the stamens, with a small notched stigma. Capsule variable, ovate, or obcordate, more or less flat or turgid, two-celled, four-valved. Seeds orbicular, compressed, peltate or umbilicate. The leafy stems, the small blue, or rarely pink or white flowers, and the orbicular flat seeds distinguish this genus.

SECT. I.—Mostly annual plants. Leaves all uniform or gradually reduced to bracts. Flowers solitary, either distant or in terminal clusters.

§ 1. Annuals. Leaves uniform. Flowers on curved, reflexed peduncles, separate, solitary, axillary.

1. **V. hederifolia**, Linn. Ivy-leaved Speedwell. E. B. 2603, L. C. 759. Root branching, fibrous. Stems prostrate, spreading, simple or branching, soft, downy, or hairy. Leaves petiolate, the lower opposite, the others alternate, slightly cordate at the base, *three-five-lobed*, with obtuse or shortly-pointed lobes, the uppermost lobes largest. *Pedicels as long as the leaves*, reflexed when in fruit. Sepals large, cordate-acuminate, ciliated (fringed at the margin). Corolla pale blue or nearly white, veined, *much smaller than the calyx*. Fruit nearly globular, two- or four-lobed, with large peltate seeds convex on one side and concave on the other. Fields and rubbish; common. Annual. March.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

2. **V. agrestis**, Linn. Procumbent Speedwell. E. B. 2603, L. C. 760. Root branching, with long fibres. Stems solitary or few, diffuse, prostrate, or ascending, round, stout, pubescent, glandular, either simple or branching at the base, bearing flowers almost from the base. Leaves petiolate, uniform, ovate-cordate, *crenulated or lobed*, lobes entire or toothed, the lower opposite, the upper alternate. Flowers on pedicels which are *longer than the leaves*; pedicels bent and reflexed in fruit. Sepals large, ovate, obtuse or pointed, as long

as the fruit, slightly unequal, corolla veined, exceeded by the calyx. Fruit large, turgid, two-lobed, downy or hairy, crowned by the remains of the style, lobes not divergent, four-twelve-seeded. Seeds oblong, concave, slightly rugose. Fields and rubbish. Common. March—November.

A. 18, C. 81. Lat. 50° — 60° . Alt. 0—100 yards. T. 52° — 46° .

Var. β . (*V. grandiflora*?). Stems prostrate, round, branching, hairy, leafy. Leaves of the barren shoots opposite, of the flowering stems alternate, cordate, crenate, hairy, rugose, petioled. Sepals ovate-lanceolate. Petals *deep blue or whitish, with deep blue lines, larger than the sepals*. Capsule obcordate, with divergent sharply-keeled lobes, very hairy on pedicels, which are nearly as long as the leaves.

Var. γ . *polita*, Fries. E. B. 783, L. C. 761. Stem usually slenderer than in the type. Leaves more or less glabrous, shining. Sepals pointed. Corolla of a beautiful deep blue, often large. Fruit very turgid and downy. In fields. Not uncommon.

A. 16, C. 70. Lat. 50° — 57° . Alt. 0—200 yards. T. 52° — 47° .

3. **V. Buxbaumii**, Tenore. Buxbaum's Speedwell. E. B. 2769, L. C. 762. Stems prostrate or ascending, diffuse, downy or hairy, usually branching. Leaves alternate, the lower opposite, on short petioles, hairy or downy, especially below, slightly cordate at the base, ovate-roundish, crenate or lobed, teeth or lobes mostly entire. Peduncles twice as long as the leaves, reflexed at the top when near maturity. Divisions of the calyx large, ovate-lanceolate, divaricated, in pairs, longer than the fruit. Corolla larger than the calyx, veined. Capsule *hairy, broad, with obtuse, divergent, compressed lobes, five-eight-seeded*. Style long. Seeds oblong, concave, wrinkled. Naturalized. On rubbish and in fields. Annual. April—October. Berks; Surrey, near Guildford; Wandsworth steam-boat pier.

§ 2. Plants annual. Upper leaves reduced to bracts. Pedicels of the fruit erect, or nearly so.

4. **V. triphyllus**, Linn. Blunt-fingered Speedwell. E. B. 26, L. C. 749. Stems weak, reclining, mostly with divergent branches. Lower leaves ovate, more or less crenate or incised; upper leaves *palmate, in three-five oblong or spathulate segments*; the upper ones sometimes entire, linear (reduced to the terminal segment). Flowers distant, *on pedicels longer than the leaves*. Segments of the calyx (sepals) unequal, oblong, blunt, rather longer than the capsule, hairy, glandular. Corolla deep blue, not quite so long as the calyx. Capsule roundish, notched, lobes turgid at the base. Style longer than the lobes of the capsule. Seeds eight-twelve, *black, concave, finely granulated (tuberculated)*. Sandy fields. Norfolk and other eastern counties. Annual. March—May.

A. 2, C. 3. Lat. 52° — 54° . Alt. 0—50 yards. T. 49° — 48° .

5. **V. verna**, Linn. Vernal Speedwell. E. B. 25, L. C. 748. Stems several or solitary, erect, simple, or with almost radical, erect branches, downy or glandular, especially above. Lower leaves oblong entire or incised, attenuated below into petioles, upper

leaves pinnatifid, five-seven lobed, the terminal lobe the largest. Uppermost leaves entire, alternate. Flowers on pedicels, which are shorter than the leaves. Divisions of the calyx unequal, longer than the capsule. Corolla pale blue, shorter than the calyx. Capsule very broad, with a large notch (obcordate), hairy, glandular, ciliated; lobes flat, spreading, as long as the style. Seeds small, yellowish, almost smooth, nearly flat on the inner surface. Sandy heaths; in Norfolk and Suffolk. Annual. May.

A. 1, C. 2. Lat. 52°—53°. Alt. 0—50 yards. T. 49°—48°.

6. **V. arvensis**, Linn. Wall Speedwell. E. B. 734, L. C. 747. Stems solitary or several, erect or spreading, simple or branching, hairy, especially above. Leaves slightly hairy, toothed, sessile; the lower ones opposite, ovate, or somewhat cordate, the upper alternate, oblong or lanceolate, entire, somewhat longer than the fruit. Flowers almost sessile, in lax spikes (clusters). Fruit (capsule) small, ciliate, roundish, deeply notched, lobes compressed, nearly sessile, shorter than the divisions of the unequal segments of the calyx. Style short. Seeds small, yellow, finely wrinkled, scarcely concave on the inner side. Banks, walls, rubbish. Annual. April.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards.

§ 3. Perennial plants. Root horizontal or stems rooting at the base. Upper leaves reduced to bracts. Flowers in terminal clusters, usually spiked. Pedicels of the fruit erect.

7. **V. serpyllifolia**, Linn. Thyme-leaved Speedwell. E. B. 1075, L. C. 750. Stems usually numerous, reclining and rooting at the base, slender, erect, simple, rarely branching below, clothed, with very fine down. Leaves glabrous, thick, the lower opposite, sessile, or nearly so, ovate, entire, or with a few small, erect teeth, the upper leaves alternate, oblong or linear. Pedicels shorter than the leaves. Flowers in lax clusters. Divisions of the calyx almost equal, oblong, shorter than the capsule. Corolla small, blue veined. Capsule glabrous, slightly notched at the apex, with from twenty-thirty seeds. Style about as long as the capsule. Seeds very small, yellow, scarcely concave. Moist pastures, ditches, roadsides. Not uncommon. Perennial. May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—700 yards. T. 52°—40°.

Var. *humifusa*. Stems prostrate, hairy, branching from the base, clusters short.

8. **V. spicata**, Linn. Spiked Speedwell. E. B. 2, L. C. 746. Root-leaves obovate. Stems erect, round, stout, leafy, pubescent, simple, branching above, more or less numerous. Stem-leaves elliptical, lanceolate, sharply serrated with triangular or ovate sharp teeth, tapering at the base into short leaf-stalks, thick, hairy. Flowers bright blue, in dense elongated spikes, which are usually solitary on the wild examples, and often in pairs on cultivated specimens. Bracts much longer than the pedicels. Sepals ovate-lanceolate. Tube of the corolla elongate (longer than its diameter). Segments elliptical, twice as long as the sepals, mostly reflexed. Filaments and anther deep blue. Style very long, blue. Capsule ovate,

hairy, crowned by the long deflexed style. Chalky pastures and limestone cliffs. Perennial. July, August.

A. 4, C. 8. Lat. 51° — 55° . Alt. 0—250 yards. T. 49° — 47° .

Naturalized on Wandsworth Common, opposite the County Jail, in a deep cutting whence ballast was taken. The *Veronica* was partly surrounded by furze-bushes in which a few plants of *Dianthus barbatus* were growing. At the same end of the cutting (the Wandsworth end) there are a few plants of *Drosera rotundifolia* and *Lycopodium inundatum*. Both of these latter plants are well established. It is a curious fact that neither of these were previously observed on any part of Wandsworth Common. In the depression *only*, caused by the railway, are they now to be seen. *Melilotus vulgaris*, *Oenothera biennis*, and *Feniculum officinale* are naturalized on a heap of shingly gravelly clay, near the bridge, at the end of the cutting towards Wimbledon.

Var. *V. hybrida*, Linn. Hybrid Speedwell. E. B. 673. Leaves ovate, crenate, with larger and more rounded teeth than *V. spicata*, whole plant hairier; flowers paler. Humphrey Head, near Cartmel, Lancashire. John Windsor, M.D. (See "Phytologist," N. S., November, 1857.)

9. *V. alpina*, Linn. Alpine Speedwell. E. B. 484, L. C. 751. Root *creeping, with long fibres*. Stems solitary, or several from the same root (branching at the base), *erect* or reclining, straight or flexuous, four-six inches high, more or less hairy and leafy. Leaves *ovate* or *elliptical*, toothed or entire. Flowers bright blue, in a short cluster, pedicels hairy. Sepals *fringed*. Fruit oblong or obovate, more or less notched, crowned with the persistent style and capitate stigma. On the sides of rills; on the highest mountains of Scotland. Perennial. July, August.

A. 2, C. 6. Lat. 56° — 58° . Alt. 700—1200 yards. T. 39° — 34° .

10. *V. saxatilis*, Linn. Blue Rock Speedwell. E. B. 1027, L. C. 752. Stems woody at the base, *decumbent*, branching above, downy, leafy. Leaves *obovate* or *oblong*, with a few teeth near their centre, on short petioles. Flowers large, bright blue, on *longish stalks*, in short lax clusters. Sepals equal, oblong. Petals obovate, rounded. Capsules downy, ovate, attenuated above, truncate or slightly notched, crowned with the *bending style*. Rocks. Ben Lawers. Perennial. June, July.

A. 2, C. 4. Lat. 56° — 59° . Alt. 750—900 yards. T. 39° — 37° .

11. *V. fruticulosa*, Linn. Carnation-coloured Speedwell. E. B. 1028, L. C. List C. Root strong and woody. Stems *shrubby at their base*, with flowering branches. Leaves elliptic-lanceolate, serrated or entire. Clusters spiked or corymbose. Flowers *flesh-coloured*, stalked. Calyx enlarged after flowering. Capsule elliptic. Seeds flattish, smooth. Scottish mountains; Ben Lawers. Mr. R. Brown. Perennial. July.

SECT. II.—Perennial (British species). Flowers in axillary, terminal, not leafy clusters.

12. *V. officinalis*, Linn. Common Speedwell. E. B. 765, L. C.

756. Root branching and creeping, often producing barren shoots. Stems several, rigid, hairy, prostrate, often rooting at the base, erect at the summit. Leaves *ovate or oblong*, hairy, tapering into a short petiole, toothed or crenate, obtuse or pointed. Flowers in *spiked clusters, on round, firm, common peduncles*; pedicels shorter than the linear bracts. Divisions of the calyx equal, shorter than the fruit. Corolla larger than the calyx. Capsule small, strongly ciliate, *triangular obcordate*, compressed; cells many-seeded. Style about as long as the capsule. Seed flat on the inner side (face). Heaths and woods. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards. T. 52°—38°.

13. **V. hirsuta**, Hopk. Small Hairy Speedwell. E. B. 2673, L. C. 756 b. This species or variety is said to be distinguished from *V. officinalis* by its entire and not cordate or notched capsule. The plant, Smith says, is like a starved variety of the foregoing, with stalked, small, narrow leaves, and unaltered by culture. In Ayrshire, Scotland. Perennial. June.

13*. **V. montana**, Linn. Mountain Speedwell. E. B. 766, L. C. 757. Root widely creeping. Stems prostrate, often rooting, simple or branched at the base, round, hairy all over. Leaves hairy, opposite, *all petiolate*, ovate, or almost cordate at the base, toothed, usually reddish below. Pedicels more than twice as long as the linear bracts. Flowers in lax clusters. Sepals ciliated, oblanceolate equal. *Capsule orbicular, dilated, notched, longer than the sepals*. In woods and shady places. Not very unfrequent. Perennial. May—July.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

14. **V. Chamædrys**, Linn. Germander Speedwell. E. B. 623, L. C. 758. Roots slender, creeping extensively. Stems solitary or several, reclining and rooting at the base, and then ascending, simple or slightly branched, the internodes (space between the leaves or junctures) *furnished with two opposite rows of hairs, alternating in each internode*. Leaves wrinkled, with prominent nerves and large teeth, cordate at the base, ovate, *nearly sessile*, the upper ones quite so. Flowers in lax clusters on longer or shorter pedicels, with small bracts. Sepals leaf-like, unequal, ciliated, longer than the fruit, and diverging in pairs. Corolla larger than the calyx, veined. Fruit hairy, roundish, *notched and flattened*, with a rather long persistent style. Hedges, woods, roadsides. Perennial. May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards.

Note.—The three following species are marsh or water-plants.

15. **V. scutellata**, Linn. Narrow-leaved Marsh Speedwell. E. B. 782, L. C. 753. Stems slender, prostrate, and rooting at the base, ascending above, simple or branched, glabrous. Leaves opposite, sessile, *linear-lanceolate*. Pedicels of the fruit *three-four times longer than the bract*, in lax clusters. Divisions of the calyx equal, oblong, shorter than the capsule. Corolla pale blue, veined, longer than the calyx. Capsule slightly compressed, strongly notched at the apex. Seeds small, flat on both sides, smooth. Marshy, watery places. Perennial. July.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—500 yards. T. 52°—41°.

Var. *β. pubescens*, Koch. *V. parmularia*, Poit. Stem hairy.

16. **V. Anagallis**, Linn. Water Speedwell. E. B. 781, L. C. 754. Stems *succulent, stout, erect* or ascending, often rooting at the base, *hollow*. Leaves smooth, somewhat fleshy, *opposite*, sessile, half-clasping, *ovate or lanceolate*, laxly toothed or sinuate. Flowers in lax, many-flowered axillary clusters, on pedicels usually *shorter than the bracts*. Divisions of the calyx equal, oblong-lanceolate, rather longer than the fruit. Corolla *about equal to the calyx*, pale blue, veined. Fruit smooth, roundish, scarcely notched, many-seeded. Seeds nearly flat on the inner side. Watery places. Annual; rarely perennial. July. Perennial according to Smith. "Eng. Fl.," vol. i., p. 21.

A. 18, C. 81. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

17. **V. Beccabunga**, Linn. Brooklime. E. B. 635, L. C. 755. Stems solitary or several, stout, succulent, hollow, round, *reclining* and rooting at their base, simple or branching, glabrous. Leaves glabrous, fleshy, opposite, petiolate, *ovate or oblong, blunt*, laxly toothed or sinuate. Flowers in axillary opposite clusters on long common stalks. Pedicels *about as long as the linear bracts*. Calyx rather longer than the capsule. Corolla *somewhat longer than the calyx*. Fruit glabrous, small, roundish, nearly entire at the apex, turgid, containing many seeds. Style not quite so long as the capsule (fruit). Seeds small, almost flat on the inner side. Ditches and watery places; common. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards. T. 52°—37°.

V. peregrina, Linn. Whole plant glabrous. Stems solitary or several, three-six inches high, erect or spreading, usually much branched. Leaves oblong-obtuse, the upper ones oblong-linear or spathulate, usually entire, *much longer than the capsules*. Pedicels very short, erect. Divisions of the calyx slightly unequal, only a little longer than the capsule. Corolla smaller than the calyx. Capsule small, glabrous, scarcely notched at the apex, containing numerous small, smooth, yellow seeds. Style very short. Annual. July. Ireland.

"These plants were gathered in the fruit-garden of the Lodge, Belfast, and, though not confined to one spot, were principally found growing among parsley."—Rev. W. M. Hind, in "Phytologist," N. S., vol. ii., p. 47.

II. **Limosella**, Linn. Mudwort. Aquatic or marsh plants. Flower-stalks radical, simple, naked. Leaves linear or spathulate, entire, aggregate. Flowers small, axillary and solitary. Calyx five-cleft or five-parted; segments acute, equal. Corolla campanulate, with a deeply five-cleft limb, and spreading, slightly unequal segments. Capsule two-celled, two-valved. Seeds numerous, on a large central receptacle. The place of growth, the minuteness of the plant, the tufted, sometimes long leaves, which rise to the top of the water when the plant is immersed, and the minute flowers are characteristic of this genus.

L. aquatica, Linn. Common Mudwort. E. B. 357, L. C. 788. Plant developed in water, flowering in dried-up places. Rhizomes filiform, horizontal, producing flowers and leaves at distant intervals. Leaves spatulate or oblong, glabrous, slightly fleshy, tapering into long petioles and in lax rosettes. Flowers numerous, on radical peduncles, shorter than the leaf stalks. Anthers dark purple. Capsule ovate. Seeds very small, ovate, tubercled. In water, and where water has stood. Perennial. June—September.

A. 13, C. 30. Lat. 50°—57°. Alt. 0—200 yards. T. 50°—47°.

III. Scrophularia,* Linn. Figwort. Herbaceous, sometimes shrubby plants, perennial, rarely biennial. Stem tall, four-angled, leafy, leaves opposite, simple in the British species. Flowers cymose, in axillary or terminal contiguous panicles. Calyx five-lobed or in five deep segments. Corolla widely-tubular, inflated, with a very small five-cleft limb, the upper segment reflexed, two lateral spreading, two lower ones erect. Stamens four, fertile, and one abortive or barren (*staminodium*), which is attached to the base of the upper lip, and terminates in a blunt scale. Capsule ovate or globular, pointed, two-celled, two-valved, with partitions from the inflexed margins of the valves. Many-seeded, opening by two valves. The tall, erect, leafy, sharply quadrangular stems, and especially the curious inconspicuous small flowers are characteristic of this genus.

1. **S. nodosa**, Linn. Knobby-rooted Figwort. E. B. 1544, L. C. 774. Roots swollen, knotty. Stem erect, four-angled, *not winged*, more or less branched, about two feet high. Leaves ovate-lanceolate, slightly cordate at the base, serrated, glabrous, with *not-winged* petioles. Flowers brown, green, or pale yellow, with a dark purple upper lip, in a more or less leafy panicle (cyme). Calyx lobes herbaceous, with a very narrow scarious margin, blunt. Rudimentary stamen (*staminodium*) nearly entire. Fruit (capsule) ovate acuminate, slightly pointed. Moist, shady banks. Perennial. July, August.

A. 18, C. 80. Lat. 50°—58° (60°). Alt. 0—250 yards. T. 52°—45°.

2. **S. aquatica**, Linn. Water Figwort. E. B. 854, L. C. 775. Root scaly. Stems quadrangular, erect, robust, glabrous, angles sharp or winged, sides furrowed, branching especially above, leafy. Leaves on winged petioles, glabrous, or nearly so, cordate at the base, ovate-oblong, or oblong, crenate or toothed, sometimes with leaflets at the base (auricled). Flowers paniced, more or less leafy. Divisions of the calyx roundish, with a *broad, scarious, wrinkled, torn margin*. Corolla urceolate; upper lip divided, with overlapping lobes; divisions roundish, reddish brown, lower lip green. Stami-

* This name should be spelled *scrofularia*, from Latin *scrofula*, scurvy, a disease for which this or some kindred plant was believed to be a specific remedy. "Ex hac herbâ unguentum conficitur ad omnis generis scabiem utilissimum, quo ipse (inquit Tragus) scabies lepræ simillimas sanari vidi." (Ray, *sub verbo*, "Cat. Plant.," p. 268.) The ancient *phytologists* were not always *philologists*. It is an example of the inveteracy of habit. It might be supposed that its derivation was Greek, which it is not. In the sixteenth century it was written *scrofularia*. (See Cooper's "Thesaurus," *sub voce*.)

node (rudiment of the fifth stamen) roundish, stipitate, entire. Capsule roundish, abruptly pointed. Ditches, river-sides, and watery places. Perennial. July, August.

A. 14, C. 50. Lat. 50° — 56° . Alt. 0—200 yards. T. 50° — 47° .

S. Ehrharti (?), Stev. Ehrhart's Figwort. E. B. 2875, L. C. 774*. Stem quadrangular, *winged*, branched and leafy. Leaves broadly cordate acuminate, sharply serrated, with larger teeth near the base, limb decurrent, petiole winged, all the leaves stalked; floral leaves (bracts) cordate like the others. Cymes six-eight-flowered, numerous. Sepals broad, obtuse, rounded, but slightly scarious at the margin. Corolla small. Stamodium obcordate, stipitate. Capsule ovate, roundish, crowned with the long persistent style. Seeds wrinkled, tubercular. Near water. Upper Clent, near Stourbridge, Worcestershire.

This variety (we do not know Steven's except in the herbarium state) agrees, on the whole, better with *S. aquatica* than with *S. nodosa*. It is plentiful in the valley between the Clent-hills (Clatterbatch), and is not associated with either of the two species to which it is intermediate.—A. I.

A. 10, C. 25. Lat. 50° — 56° . Alt. 0—150 yards. T. 50° — 47° .

3. *S. Scorodonia*, Linn. Sage-leaved or Balm-leaved Figwort. E. B. 2209, L. C. 776. Stem erect, acutely angular, downy. Leaves cordate at the base, ovate, doubly crenated or toothed, petioled, downy on both sides. Flowers in axillary, opposite cymes, on divaricated pedicels. Sepals ovate, blunt. Corolla purplish. Stamodium roundish, entire. Capsule ovate-roundish, pointed. Cornwall. Ireland. Jersey. Perennial. July.

Looks very like *S. nodosa*.

A. 1, C. 2. Lat. 50° — 51° . Alt. 0—50 yards. T. 52° — 51° .

S. vernalis, Linn. Vernal or Yellow Figwort. E. B. 567, L. C. 777. Root biennial. Stems downy or woolly, hollow, almost four-angled. Leaves rounded or broadly cordate, pointed, incised or toothed, downy. Flowers *yellow*, in axillary cymes, aggregate. Calyx herbaceous, with oblong, spreading divisions. Corolla inflated, contracted at the top, with a minute five-cleft limb. Fruit capsular, ovate, acuminate, crowned by the persisting style. Lane between Merton and Mitcham, where it has been observed during a century at least. (See Huds., p. 240, 1st ed.) Biennial. May.

A. 4, C. 6. Lat. 51° — 54° . Alt. 0—100 yards. T. 49° — 48° .

Note.—This is a rare plant in France, and is very local in the south of England. *Abundant & luxuriant on Moncreiffe hill near Perth*
John Sim

IV. *Digitalis*, Linn. Fox-glove. Biennial or perennial plants, with alternate, crenulate, or toothed leaves, and purple, rarely white flowers, in terminal unilateral clusters. Calyx five-parted, with unequal divisions, enlarged when in fruit. Corolla campanulate or tubular-inflated, with a short, oblique, two-lipped limb, lower lip three-lobed, the middle one bearded within. Anther lobes divergent, capsule many-seeded, with very thick placentas and septicidal dehiscence.

The simple, erect, tapering, leafy stems, the large, ovate or elliptic oblong leaves, and especially the handsome bell-shaped flowers, in long leafy clusters, distinguish this genus.

D. purpurea, Linn. Purple Fox-glove. E. B. 1297, L. C. 778. Stems robust, erect, round, tapering, quite straight, usually quite simple, sometimes branching above, leafy. Leaves ovate-oblong or lanceolate, wrinkled, with prominent nerves, crenulate, the lower leaves large, tapering into the long petioles; upper ones sessile, clasping, more or less downy, especially below. Flowers in spiked unilateral clusters. Divisions of the calyx oblong or ovate. Corolla glabrous without, hairy within, purple, rarely white, upper lip very obtuse or truncate spreading, lobes of the lower lip shallow, rounded. Capsule ovate-acuminate, downy. On sandy or gravelly banks, woods, &c. Biennial. June, August.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—650 yards. T. 52°—40°.

V. Antirrhinum, Juss. Snap-dragon. Plants of one, two, or several years' duration. Stems simple, round, leafy. Leaves simple, narrow, entire. Flowers axillary, or in terminal clusters. Calyx five-parted. Corolla ringent and personate, gibbous at the base, tumid, upper lip cleft, lower lip three-lobed, with a prominent palate which closes the mouth. (A good example of a personate (masked) flower). Capsule ovate, two-celled, *opening by three round pores at the top*, the lower cell by two, the upper by one. Seeds numerous, on a central placenta.

1. **A. majus**, Linn. Great Snap-dragon. E. B. 129, L. C. 779. Stems round, stout, smooth, glandular at the top, simple or branched, leafy. Leaves lanceolate, tapering both ways, rather thick, glabrous. Flowers in terminal clusters. Divisions of the calyx downy-glandular, *ovate or roundish, short*. Corolla large, *very much longer than the calyx*, red or whitish, with a yellow palate. Fruit irregularly ovate, slightly pubescent, glandular, longer than the calyx. On old walls. Perennial. June.

It has established itself on the steep sides of many chalk quarries, and on cuttings through the chalk in North Kent. *Centranthus ruber* abounds in the same situations.

Alien.

2. **A. Orontium**, Linn. Field Snap-dragon. E. B. 1155, L. C. 780. Stems rigid, erect, simple or slightly branched, hairy, leafy. Leaves lanceolate or linear-lanceolate, tapering below. Flowers axillary, on stout, erect pedicels, in terminal, leafy clusters. Sepals leaf-like, *linear-lanceolate, elongate, very unequal*, with a prominent middle-nerve. Corolla striated, purple. Capsule irregularly ovate, hairy. Sandy corn-fields. Annual. June—September.

A. 8, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—18°.

VI. Linaria, Mill. Toad-flax. Annual or perennial plants. Stems either flaccid and prostrate, with broad leaves, or rigid, upright, with linear, scattered leaves. Flowers either solitary and axillary,

or spiked, racemose and terminal. Calyx five-parted. Corolla personate, spurred at the base. Capsule opening by teeth or valves at the apex. The habit of this genus is twofold: first, some have upright, tapering, rigid, panicle stems, with entire, linear, scattered and crowded leaves and terminal flowers; secondly, others have prostrate, round, flaccid stems, with variously lobed or entire broad leaves and axillary flowers. The sharp, pointed spur is the obvious characteristic, and the capsule opening by teeth or valves is the essential discriminating mark of the genus.

SECT. I.—Leaves linear or nearly so, sessile or narrowed at the base. Flowers in terminal clusters on short pedicels. Throat, except in *L. minor*, completely shut by the palate.

1. *L. vulgaris*, Moench. Common Toad-flax. E. B. 658, L. C. 785. Stems erect, simple or branched, smooth or hairy. Leaves scattered, contiguous, linear, lanceolate, tapering at both ends. Divisions of the calyx triangular, pointed, with a scarious, scarcely entire margin, shorter than the capsule. Flowers yellow, in more or less dense spike-like clusters, which are simple or branched. Corolla large, pale yellow; palate saffron colour, with a short, conical, tapering spur. Capsule surrounded by a thickened disk. Seeds with a smooth margin, *rough and tubercled* in the centre. Hedges not uncommon. Perennial. July—September.

Var. *speciosa*, Broomfield. Roots thick, woody. Stems woody at the base, half an inch in diameter, glaucous, branched from the base and again at the top. Leaves lanceolate, flat, with five distinct nerves, more or less prominent at the base. Flowers large, showy, in rather lax clusters. In a chalk quarry at Northfleet, Kent.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

2. *L. repens*, Ait.. Creeping Toad-flax. E. B. 1253, L. C. 784. Stems erect, branching, glaucous. Leaves linear-lanceolate, or linear; mid-nerve very prominent, lower leaves whorled, upper scattered. Flowers *bluish, striated*, in spike-like, more or less lax clusters. Divisions of the calyx *linear, shorter* than the capsule. Corolla bluish white, *striped with violet*, with a *short conical spur*. Fruit rather small, roundish, subdidymous. Seeds ovate-triangular, with smooth sharp angles and tubercled sides. Chalky fields. Rare. Perennial. July.

A. 9, C. 20. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—48°.

L. supina, Desf. Prostrate Toad-flax. Stem glabrous, glaucous, *prostrate* at the base, then erect, simple, or slightly branched. Leaves linear, narrow, the lower three-five together, the upper scattered. Flowers imbricated, in short, dense clusters. Divisions of the calyx *linear, obtuse, shorter than the capsule*. Corolla large, pale yellow, palate orange, with a very long spur. Capsule roundish. Seeds smooth, black, shining, almost flat, with a slightly elevated border. South-west of England. Annual. May—September.

2*. *L. pelisseriana*, Mill. Pelisser's Toad-flax. E. B. 2832,

L. C. 786. Stems erect, rigid, simple, or with erect branches. Leaves linear, narrow, scattered, distant, *those on the barren shoots dilated*. Flowers in lax spike-like clusters. Sepals linear, longer than the capsule. Corolla violet-blue, with a very long spur. Seeds smooth, nearly flat, *surrounded with a ciliate border*. Jersey. Annual. June.

7 *L. purpurea*, Mill. Purple Toad-flax. "Bot. Mag.," p. 399. Stems erect, leafy. Leaves numerous, linear-lanceolate. Flowers purple, in long terminal clusters. Sepals linear, shorter than the fruit (?). Lower lip of corolla striated, with a very prominent hairy palate, and a conical, somewhat curved spur. On walls at Eltham, Kent. As a weed in gardens about Yarmouth, Isle of Wight. Perennial. July.

L. italica, Trev. Italian Toad-flax. "London Journal of Botany," vol. i., p. 79. Rchb. v. 421. Stems erect, flexuous, round, smooth, leafy, branching above. Leaves *linear-lanceolate*, acuminate, deep green, glaucous. Flowers *yellow*, in lax clusters. Sepals *linear-lanceolate*, slightly oblong. Upper lip of corolla erect, concave, deeply notched, with spreading, pointed lobes; palate prominent, bristly. Spur long, tapering. Seeds scabrous, with a smooth, roundish margin. Banks. Shirley, near Southampton. Mr. H. C. Watson. Perennial. September, October.

3. *L. minor*, Desf. Little Toad-flax. E. B. 2014, L. C. 787. Stems erect, branching, round, tapering, hairy or downy. Leaves linear-lanceolate, attenuated at the base, opposite below, alternate above. Flowers *solitary*, axillary, in lax clusters on long pedicels. Divisions of the calyx linear or oblong, *about as long as the corolla*, and rather longer than the capsule. Corolla pale violet, with a yellow throat, *not closed as in the other species*. Capsule ovate, oblique at the base, broad and turgid, nearly two-lobed at the apex. Seeds ovate-oblong, muricated. Sandy fields. Annual. July.

A. 12, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—47°.

SECT. II.—Leaves broad, cordate, lobed, or roundish. Flowers axillary, on long pedicels.

4. *L. Cymbalaria*, Linn. Wall Toad-flax. E. B. 502, L. C. 781. Stems numerous, spreading, with *elongated branches*. Leaves alternate, *on long* petioles, thick, often reddish below, roundish, *cordate at the base, with five-seven large, blunt, mucronate lobes*. Pedicels a little shorter than the leaves. Calyx shorter than the fruit. Corolla rosy-bluish, with a yellow palate, and short bent spur. Fruit roundish, with elevations produced by the seeds. Seeds ovate, large, with granular surface. On old walls in many places. Perennial. May.

A. 14. Alien.

5. *L. spuria*, Mill. Round-leaved Toad-flax. Fluellin. E. B. 691, L. C. 782. Stems numerous, diffuse, prostrate, branching, hairy. Leaves on short petioles, *oblong, roundish*, with blunt points, often slightly cordate at the base, hairy. Pedicels capillary, hairy, mostly longer than the leaves. Divisions of the calyx ovate, very hairy. Corolla yellow, upper lip small, deep violet. Spur slightly curved. Capsule roundish. Seeds ovate, tubercled. Chalky fields. Annual. July.

A. 7, C. 30. Lat. 50°—54°. Alt. 0—200 yards. T. 51°—48°.

6. **L. Elatine**, Desf. (Mill^p). Fluellin, or Sharp-pointed Toad-flax. E. B. 692, L. C. 783. Stems prostrate or ascending, spreading, branching, very hairy. Leaves alternate petioled, ovate, pointed, *hastate or toothed at the base*; the lower ones rounded, scarcely hastate. Pedicels smooth, capillary, longer than the leaves. Divisions of the calyx ovate, *pointed*, rather longer than the fruit. Corolla pale yellow; upper lip violet. Spur slightly curved. Capsule roundish. Seeds ovate, tuberculate. Fields. Annual. July, August.

A. 9, C. 40. Lat. 50°—54°. Alt. 0—200 yards. T. 52°—48°.

VII. **Pedicularis**, Linn. Lousewort or Red-rattle. Biennial or perennial plants, with opposite or alternate pinnate leaves. Flowers rose-coloured, rarely white, in terminal clusters. Calyx inflated unequally, five-toothed, or two-lipped, the upper lip two-toothed or entire, the lower three-toothed. Corolla two-lipped (bilabiate), the upper lip helmet-shaped, compressed, the lower three-lobed. Stamens four, concealed under the helmet (casque). Capsule many-seeded, compressed perpendicularly to the partition. Seeds ovate triangular, tubercular, surrounded by the raphe. The bushy habit, the much-divided leaves, the angular stem, and the red flowers characterize this genus.

1. **P. sylvatica**, Linn. Common Lousewort. E. B. 400, L. C. 773. Plant glabrous, with numerous stems, which rarely exceed an inch or so in height, the central one is erect, *the lateral ones spreading and flexuous*. Leaves pinnate, with incised lobes (the leaves are rather pinnatifid than pinnate, with distant incised or toothed lobes). Calyx glabrous, five-toothed (rather five-lobed with toothed lobes), when in fruit vesicular, and crowned with leaf-like appendages. Tube of the corolla much longer than the calyx; casque somewhat sickle-shaped (slightly incurved at the summit). The base of the calyx has a loose membranous appendage, which surrounds the pedicel at its junction with the ovary. In moist heathy places. Biennial or Perennial^p). April—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—650 yards. T. 52°—40°.

2. **P. palustris**, Linn. Marsh Lousewort. E. B. 399, L. C. 772. Stems *erect, solitary*, branching, glabrous, slightly hairy at the top, twelve-eighteen inches high. Leaves *pinnate*, with *pinnatifid or deeply toothed segments*. Calyx more or less hairy, two-lobed, inflated when in fruit with reflexed teeth. Upper lip of the corolla compressed, toothed, slightly sulcate about its middle, truncate at the apex. Lower lip of corolla three-lobed; lobes rounded, equal. Marshy places. Perennial or biennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—600 yards. T. 52°—41°.

VIII. **Rhinanthus**, Linn. Yellow-rattle. Annual plants, with erect, square, leafy stems. Leaves sessile, oblong, serrated. Flowers spicate, bracteate. Calyx compressed, inflated with four nearly equal acute teeth. Corolla ringent, upper lip hooded, compressed, slightly cleft; lower lip expanded, three-lobed, the central

lobe the largest. Capsule ovate, compressed, pointed with the remains of the style(?), two-celled, two-valved, opening at the margin. Partitions transverse. Seeds obovate, compressed, more or less bordered. The square rough stems, sessile serrated leaves, spiked flowers, and flattish seeds distinguish this genus.

1. **R. Crista-galli**, Linn. Meadow-rattle. E. B. 657, L. C. 767. Stems rigid, erect, glabrous, simple or branching, angular. Leaves sessile, oblong or lanceolate, deeply toothed, scabrous, and slightly wrinkled, scaly below, lateral nerves ending in the angles between the teeth; floral leaves (bracts) broader at the base, cordate, paler or discoloured. Calyx smooth, inflated. Corolla yellow, with a tube about as long as the calyx. *Lobes of the upper lip short, roundish*. Seeds broader than their border. Meadows. Annual. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—850 yards. T. 52°—38°.

Var. β . Whole plant slenderer than the type. Stem simple, leaves narrow, the floral one pale green.

2. **R. major**, Ehrh. Greater Yellow-rattle. E. B. 2737, L. C. 767 b. Stems round, rigid, erect, simple below, branching above. Leaves linear-lanceolate, sharply and deeply serrated, opposite. Flowers in unilateral crowded clusters, terminating the upper branches. Bracts incised, especially at the enlarged base, with long acuminate teeth. Calyx glabrous, finely reticulate, turgid, with short, triangular teeth. Tube of the corolla slightly curved, lips spreading; *lobes of the upper lip oblong*. Seed ovate, with a broad margin. Corn-fields, in the north of England and Scotland. Annual. July, August.

A. 12, C. 50. Lat. 50°—61°. Alt. 0—200 yards. T. 50°—45°.

IX. Melampyrum, Linn. Cow-wheat. Annual, branched, spreading plants, with four-angled stems, and opposite entire leaves. Flowers axillary and leafy, or spicate and bracteate. Calyx tubular, four-toothed. Corolla ringent, with a curved tube and gaping limb; upper lip compressed, with a reflexed margin, lower lip flat, three-cleft, with two protuberances on the palate. Capsule oblong, abliquely pointed, opening at the upper margin. Seeds one in each cell, ovate-oblong, attached by a short, thick funiculus to the base. The annual roots, upright stems, with spreading or horizontal branches and entire sessile leaves, and the *large solitary seeds, resembling grains of wheat*, distinguish this genus.

1. **M. cristatum**, Linn. Crested Cow-wheat. E. B. 41, L. C. 768. Stem rigid, erect, downy above, with horizontally spreading branches. Leaves linear-lanceolate, very rough or hispid; floral leaves (bracts) *closely imbricated in four rows*, broad and cordate at the base, acuminate, their lower part furnished with *numerous, acuminate, lanceolate, ciliate teeth*. Flowers in *quadrangular, dense spikes*. Calyx tubular, with two hairy lines, not one-third part so long as the tube of the corolla, and shorter than the capsule. Corolla nearly shut. Woods. Annual. July, August.

A. 3, C. 11. Lat. 50°—53°. Alt. 0—100 yards. T. 50°—48°.

2. **M. pratense**, Linn. Meadow Cow-wheat. E. B. 113, L. C.

770. Stems rigid, almost glabrous, erect, branching almost from the base; branches divergent, *horizontal*. Leaves sessile, lanceolate or linear-lanceolate, rough at the margin; the floral leaves on short stalks, incised-pinnatifid at the base, with linear teeth. Flowers in pairs, spreading on one side. Calyx with linear-setaceous teeth, *not so long as the fruit*. Corolla yellow, or yellowish white, closed, upper lip compressed. Woods. Annual. July.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—1000 yards. T. 51°—36°.

Var. β . *M. montanum*, Johnstone. Stem mostly simple, much smaller in all its parts than the type. Leaves oblong, hispid, very finely toothed, bracts entire. Mountainous places; not uncommon.

Var. γ . *latifolium*. Teeth of the floral leaves (bracts) diverging and declining, broadly cordate.

Var. *majus* (?), "Brit. Flor." Plant bushy. Flowers larger than in *M. pratense*, colour lighter. Leaves large, some an inch broad at the base, lanceolate. Spikes not so close as those of *M. pratense*.

3. *M. sylvaticum*, Linn. Sylvan Cow-wheat. E. B. 804, L. C. 771. Stems ascending or erect, rigid, much branched. Branches spreading, opposite. Leaves *linear-lanceolate*, *entire*. Flowers axillary, distant, in pairs. Bracts entire, calyx-lobes long, lanceolate, serrated. Corolla small, deep, yellow. Mountainous woods. Annual. July.

A. 7, C. 15. Lat. 54°—58°. Alt. 100—350 yards. T. 45°—43°.

4. *M. arvense*, Linn. Purple Cow-wheat. E. B. 113, L. C. 769. Stems stout, erect, much branched, roughish, branched and leafy. Leaves lanceolate or ovate-lanceolate, upper leaves toothed at the base or laciniated, with long narrow segments, bracts *purplish or red*, *pinnatifid*, with long pointed segments. Spikes angular, rather dense. Calyx-teeth elongate, spreading, ciliate, attenuated (filiform) above their base. Corolla closed, purplish, like the bracts and calyx, in colour, but with a broad yellow ring between the tube and the limb. The whole plant is more or less hispid, namely, the stem-leaves, calyx, and corolla. Corn-fields, in the Isle of Wight, and in Norfolk. Annual. June, July.

A. 3, C. 3. Lat. 50°—53°. Alt. 0—100 yards. T. 51°—48°.

X. *Bartsia*, Linn. *Bartsia*. Downy, mostly perennial plants. Stems erect, leafy. Leaves nearly sessile, serrated. Flowers spicate, bracteate. Calyx tubular, four-cleft, coloured. Corolla ringent, upper lip entire, lower lip reflexed, three-lobed, segments deep, nearly equal. Capsule ovate, pointed, compressed, two-celled, two-valved, opening lengthways (?). Seeds small, angular, numerous attached.

1. *B. Odontites*, Linn. Red-rattle. B. B. 1415, L. C. 765. Stems erect, rigid, much branched, branches spreading. Leaves *lanceolate or lanceolate-linear*, *deeply toothed*, sessile, scabrous. Calyx downy or hairy, tubular, with lanceolate lobes. Corolla downy, upper lip erect, vaulted; lower lip three-cleft, spreading, *red*. Stamens under the upper lip protruded. Fruit ovate, compressed, turgid, crowned by the long style. Pastures. Annual. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 50—1200 yards. T. 52°—35°.

2. **B. alpina**, Linn. Alpine Bartsia. E. B. 361, L. C. 763. Stems erect or ascending, angular, with blunt angles, hairy or glandular, leafy, simple. Leaves *ovate, serrated, slightly clasping*, opposite. Flowers *large, purplish blue*, downy, spiked. Calyx purplish, *viscid*. Alpine moist pastures. Gordale, Yorkshire. Perennial. July.

A. 3, C. 3. Lat. 54°—58°. Alt. 600—1000 yards. T. 48°—38°.

XI **Eufragia**, Griseb. Yellow Bartsia. Calyx tubular, four-cleft. Corolla tubular, two-lipped. Capsule pointed, cells many-seeded. Seeds slightly angular, very minute. This genus differs from *Rhinanthus* chiefly in the very minute seeds.

E. viscosa, Benth. *Bartsia viscosa*, Linn. Clammy Bartsia. L. C. 764, E. B. 361. Stem erect, round, simple, leafy, hairy-glandular, viscid. Lower leaves opposite, upper ones alternate, all ovate-lanceolate, deeply serrated, sessile; uppermost leaves sometimes linear, usually with longer teeth than the lower leaves. Flowers yellow, axillary, distant; upper ones crowded. Anthers hairy. West of the British Isles. Annual. July—September.

A. 6, C. 12. Lat. 50°—57°. Alt. 0—100 yards. T. 52°—47°.

XII. **Euphrasia**, Linn. Eyebright. Slender branching plants. Stems not angular. Leaves opposite, upper leaves often alternate. Flowers white, striated, spicate, bracteate. Calyx tubular, with four acute teeth. Corolla ringent, open, upper lip concave, entire; lower lip in three deep, more or less equal segments. Stamens four. Anthers with a long setaceous point. Capsule ovate-oblong, obtuse or notched, with two membranous valves. Seeds several, compressed, ovate, tapering.

E. officinalis, Linn. Common Eyebright. E. B. 1416, L. C. 766. Stems erect, simple or branched, hairy or downy. Leaves ovate, toothed, the floral leaves (bracts) smaller and more deeply toothed; all sessile, and more or less hairy or downy. Calyx-lobes lanceolate acuminate. Corolla striated or furrowed, downy, with reddish violet stripes, palate and throat with deep yellow patches; upper lip two-lobed, lobes notched; lower lip three-lobed, lobes notched or toothed. Stamens shorter than the upper lip. Meadows. Pastures. Commons. Annual. July.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—400 yards. T. 52°—42°.

Var. *a. pratensis*. Stem stout, erect, six-twelve inches long, downy, sometimes glandular, with numerous half-erect branches. Flowers large.

Sub-var. *grandiflora*. Flowers large, plant often very small.

XIII. **Sibthorpia**, Linn. Sibthorpia. A prostrate, hairy, perennial plant, with roundish, crenate leaves and small axillary flowers. Calyx five-parted, segments nearly equal, spreading. Corolla rotate, with a five-cleft limb; segments unequal, the two lowermost

the smallest. Capsule compressed, obcordate, two-celled, two-valved. Seeds few, attached to a globular, central receptacle. The prostrate, creeping habit, the roundish leaves, and the unequal segments of the corolla distinguish this genus.

S. europæa, Linn. *Sibthorpia*. E. B. 649, L. C. 789. Stems slender (filiform), weak, trailing, creeping, simple (?), leafy. Leaves small, round, lobed, on longish petioles, lobes truncate or very obtuse. Flowers very small, axillary, solitary, on short pedicels, inconspicuous. South-west of England, in damp, shady places. Perennial. June—September.

A. 3, C. 6. Lat. 50°—52°. Alt. 0—100 yards. T. 52°—49°.

Mimulus, Linn. Monkey-flower. Stem upright, quadrangular, leafy. Leaves ovate or elliptical. Flowers axillary and terminal, showy. Calyx tubular, five-angled, five-toothed. Corolla rotate or ringent, upper lip two-lobed, lower trifold, segments unequal.

M. luteus, Willd. Yellow Monkey-flower. L. C. 789*. Root creeping. Stems erect, succulent, glabrous. Leaves ovate-roundish, strongly nerved, toothed and sinuate, the lower leaves on long stalks, the upper ones sessile, clasping. Flowers large, yellow, one of the lobes of the corolla with a purple spot. Naturalized; in several wet or boggy places. Perennial. June.

Alien. A. 10. Lat. 51°—58°.

This plant appears to be distributed more extensively in Scotland than in England.

ORDER LVIII.—**OROBANCHACEÆ**. Rich. THE BROOM-RAPE FAMILY.

Herbaceous, leafless, parasitical plants, with scaly stems. Calyx divided. Corolla irregular, persistent, with imbricated aestivation. Stamens four, didynamous. Ovary one-celled, on a fleshy disk. Fruit capsular, two-valved, with one or two placentas in the middle of each. Seeds numerous, very minute. All the plants of this order are parasitic on the roots of other plants. Their stems are upright and succulent. They grow in various parts of the world, and especially in the southern parts of Europe, in Asia, North America, and the Cape of Good Hope.

SYNOPSIS OF THE GENERA.

Orobanche. Flowers bracteate. Upper lip of corolla cleft or notched.

Lathræa. Flowers without bracts, upper lip of corolla entire.

I. Orobanche, Linn. Broom-rape. Succulent parasites, growing on the roots of several species of plants. Stem simple. Leaves none or rudimentary. Flowers in terminal bracteate clusters. Calyx disepalous; sepals slightly united at the base or quite distinct, cleft; lobes more or less unequal. Corolla two-lipped; the upper one cleft

or notched, the lower one three-lobed, spreading. Fruit capsular, two-valved, many-seeded. Seeds minute. The species are distinguished by their yellowish or brown, erect, leafless stems.

SECT. I.—Flowers with a single bract. Sepals two.

1. ***O. rapum***, Thuill. *O. major*, Lam. and D.C. Great Broom-rape. E. B. 421, L. C. 790. Base of the stem *enlarged into thick, fleshy bulb*, surrounded with imbricated scales. Stems stout, with glandular hairs. Flowers in a dense spike. Sepals almost equally cleft. Corolla campanulate-curved, with obscurely toothed lobes. Stamens *inserted at the base of the corolla*. Filaments glabrous. Stigma *pale yellow*. Ovary *hairy or downy*. Parasitic on Broom, Furze, and other shrubby leguminous plants. Perennial. June.

A. 13, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

2. ***O. elatior***, Sutt. "Linn. Trans.," vol. iv., t. 17. Tall Broom-rape. E. B. 568, L. C. 792. Stem usually tall and slender. Flowers more numerous, more yellow, or of a lighter purple *than in O. rapum*. Lobes of the sepals unequal. Corolla glandular, margin wavy, crenate. Stamens *inserted higher in the tube than in the preceding*. Filaments *hairy or downy*. Ovary *quite smooth*, with a glandular style and smooth stigma. Parasitic on *Centaurea scabiosa*. Leatherhead, Surrey. Perennial. June.

A. 10, C. 25. Lat. 50°—55°. Alt. 0—200 yards. T. 50°—47°.

3. ***O. caryophyllacea***, Sm. Clove-scented Broom-rape. E. B. 2639, L. C. 791 Reich. 890, 891. Stem tall, glandular, very scaly at the base. Flowers *reddish, in a long, lax spike*. Sepals distinct, cleft, lobes equal or nearly so. Lobes of the lower lip of the corolla elongate, spreading, and rounded, upper one erect, notched; all crenulate and ciliate, with glandular hairs. Stamens *and style hairy*.

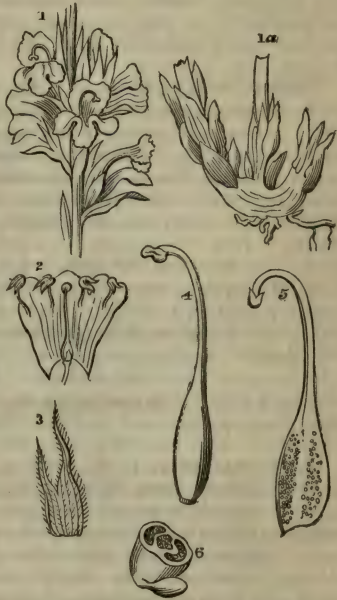


Fig. 155.—*Orobanche minor* (?). 1, Portion of spike of flowers; 1a, root and base of stem; 2, section of flower; 3, sepal detached; 4, pistil; 5, section of same, showing the ovary and ovules; 6, transverse section of same, showing the placentas.

Ovary smooth. Parasitic on *Galium Mollugo*. Kent. Rev. G. E. Smith.

A. 1, C. 2. Lat. 50°—52°. Alt. 0—50 yards. T. 50°—49°.

4. **O. rubra**, Sm. Red fragrant Broom-rape. E. B. 1786, L. C. 794, Reich. 885, 886. Stem about a foot high, scaly at the base, with viscid glandular hairs above; whole plant of a rusty purplish red. Flowers *more or less densely spiked, strongly scented*. Sepals lanceolate, *entire*. Corolla tubular below, with a two-lipped more or less spreading limb; lobes rounded, crenate and slightly fringed. Filaments fringed and glandular at the base. Ovary smooth, with a partially hairy glandular style. On basaltic rocks. Perennial. July, August.

A. 6, C. 7. Lat. 50°—58°. Alt. 0—50 yards. T. 52°—47°.

5. **O. Hederæ**, Duby. Orobanche of the Ivy. E. B. 2859, L. C. 793*. Stem six-eighteen inches, purplish, *swollen at the base*, glandular, downy, scaly. Spike long, with lanceolate bracts, which are longer than the flowers. Sepals ovate, with subulate points. Corolla cream-coloured, with prominent purple nerves, toothed, wavy. Fruit ovate, downy above. Stigma slightly *two-lobed, disk yellow*. On Ivy. July.

A. 7, C. 18. Lat. 50°—54°. Alt. 0—200 yards. T. 52°—49°.

6. **O. minor**, Sutt. "Linn. Trans.," vol. iv., p. 159. Lesser Broom-rape. E. B. 422, L. C. 793. Stem *six-twelve inches high, with violet scales*, very hairy, slightly glandular above. Bracts nearly as long as the flowers. Spike short, dense. Corolla tubular, curved, whitish, veined with blue-lilac streaks. Upper lip notched. Stamens scarcely hairy. Stigmas purple or violet. On *Trifolium pratense*, after the grass has been mowed. Annual. July, August.

A. 7, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 50°—47°.

7. **O. Picridis**, F. W. Schultz. Orobanche of the Ox-tongue. E. B. 2956, L. C. 793*. Sepals entire or toothed in front, gradually tapering into one or two subulate points. Corolla compressed, slightly curved at each end. Stamens *hairy in front along its whole length* (?), inserted above the base (below the middle of the corolla). Anthers pale purple or yellowish. Style glandular, at the base only in front, above over its whole surface. Stigma two-lobed. Isle of Wight; on *Picris hieracioides*.

From Dr. Bromfield's "Catalogue of Hampshire Plants," "Phytologist," and Mr. Babington's "Manual," 3rd edition. Annual (?). July.

8. **O. amethystea**, Thuil. Azure-coloured Broom-rape. Reich, 920, 921, L. C. 793*. Stem slender. Spike elongate, dense; bracts *longer than the flowers*. Sepals elongate-lanceolate, cleft into two subulate points, sometimes entire. Upper lip of the corolla arched; lower lip spreading, with roundish unequal lobes; margin of lobes crenate or toothed. Stamens hairy below, glabrous above, or nearly glabrous. Style hairy, glandular. Stigma with *divaricate lobes*. Parasitic, on *Daucus maritimus*. Cornwall.

A. 1, C. 1. Lat. 50°—51°. Alt. (?). T. 52°.

SECT. II.—Flowers accompanied with three bracts, two lateral, one inferior; calyx four-, rarely five-cleft; lobes nearly equal.

9. **O. cœrulea**, Vill. Purple Broom-rape. E. B. 423, Reich. 928, L. C. 795. Stem slightly downy, scarcely swollen at the base, about a foot high. Flowers in a rather dense spike, bracts linear-lanceolate, rather shorter than the calyx, lobes of the calyx lanceolate-subulate. Corolla contracted about the middle, bluish above; upper lip ascending, slightly cleft, with intermediate notches, lobes of the lower lip spreading, pointed, crenated or wavy. Filaments and anthers smooth, the latter with a small tuft of down, or a downy line at their junction. Stigma white. Grassy pastures. Norfolk, Herts, Hants. Perennial. July.

A. 3, C. 3. Lat. 50°—53°. Alt. 0—50 yards. T. 51°—49°.

10. **O. arenaria**, Bork. Blue Broom-rape. Reich. 929-30, L. C. 795*. Stem slender, pale, white, or bluish, pubescent above. Spike lax. Flowers showy, blue. Bracts linear-lanceolate, rather longer than the calyx. Calyx-lobes subulate. Corolla large, tubular, dilated above, with obtuse, spreading lobes. Filaments smooth, anthers hairy. Style hairy, glandular. Stigma pale yellow. Parasitic on *Artemisia campestris*, *Achillea Millefolium*, &c. Channel Islands. Perennial. June—August. Sarnian.

11. **O. ramosa**, Linn. Branched Broom-rape. E. B. 184, L. C. 796. Stem slender, branched near the top, downy, with distant scales, eight-ten inches high, *swollen or bulbous at the base*. Flowers pale blue or yellowish in lax spikes, each subtended by three ovate-lanceolate bracts. Calyx-lobes triangular-subulate. Upper lip of corolla deeply three-cleft; tube swollen (turgid) at the base, contracted about the centre and dilated above, with obtuse spreading lobes. Anthers glabrous. Ovary roundish; style pubescent, glandular. Parasitic on hemp. Channel Islands. Annual. June—September.

II. **Lathræa**, Linn. Toothwort. Rhizome branching, covered with imbricated fleshy scales. Calyx campanulate, four-cleft, without lateral bracts; upper lip of corolla entire; lower three-cleft; ovary consisting of four parietal placentas combined in pairs.

L. squamaria, Linn. Toothwort. E. B. 50, L. C. 797. Stem simple, fleshy, with obovate scales (bracts, abortive leaves). Flowers on short pedicels, drooping or nearly horizontal, in unilateral terminal clusters. Anthers hairy about the line of dehiscence. The whole plant is white or pale yellow when growing, but becomes quite black when dried. Woods and thickets. In a wood at Wanborough, near Guildford. Parasitical on Hazel, &c. Perennial. April, May.

A. 15, C. 40. Lat. 50°—57°. Alt. 0—200 yards. T. 50°—47°.

ORDER LIX.—**VERBASCACEÆ**, Coss. and Ger., "Flor. Par," vol. i., p. 278.

Biennial or annual plants, rarely perennial, with erect, virgate stems, and alternate decurrent leaves. Flowers in fascicles, rarely

solitary, in spike-like or branching panicles. Corolla slightly irregular, rotate, with a five-parted limb. Stamens five in the tube, and

alternate with the lobes, unequal. Ovary two-celled, with many ovules. Fruit consisting of two carpels, capsular many-seeded. Seeds small. This order is intermediate between *Solanaceae* and *Scrophulariaceae*. (Comp. Coss and Germain, *loco citato*.)



Fig. 156.—*Verbascum nigrum*. 1, Calyx; 2, corolla; 3, a stamen; 4, style; 5, ovary; 6, 2-celled capsule.

Verbascum, Linn. Mullein. Biennial, more or less woolly or mealy, herbaceous plants, rarely annual and smooth. Stems solitary, often panicle towards the top. Leaves all radical the first year, subsequently all cauline, alternate, simply or doubly crenate or toothed, rarely entire. Flowers yellow, rarely white, densely racemose, spiked or panicle. Calyx deeply five-parted. Corolla rotate, with a very short tube and spreading limb, in five rounded, deep, unequal segments. Stamens five, declining, often hairy, enlarged at the

apex. Capsule ovate, two-celled, two-valved. Seeds many, on an ovate or globular central placenta. The generally woolly habit, upright virgate stems, large, handsome, and deciduous flowers characterize the genus.

1. **V. Thapsus**, Linn. (?) Taper Moth Mullein. E. B. 549, L. C. 740. Stem erect, robust, simple or slightly branched, cottony or woolly, winged, four-six feet high. Leaves large, ovate-oblong, white and cottony on both sides, crenate or entire, the root-leaves tapering into petioles, the stem-leaves *erect and strongly decurrent*. Flowers tufted, axillary, in a long, dense, spike-like, erect, terminal cluster, which is either simple or branching. Sepals unequal, ovate-lanceolate, acuminate, woolly on the outside, glabrous within. Corolla large, nearly flat. Upper stamens woolly, lower ones nearly naked, or with a few scattered hairs only; *filaments as long as the anthers or twice as long*. Anthers linear. Capsule ovate-roundish, woolly. Seeds cylindrical, granular. Banks and roadsides. Biennial. July. A. 16, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

Var. Stem slender, round, without prominent lines (elevations), erect, rigid, leafy, about a foot high. Leaves obovate, tapering at

the base. Flowers in leafy spikes. Floral leaves (bracts) ovate. Sepals narrowly lanceolate, united more than half-way upwards. Corolla large. The three shorter filaments are slightly purplish, but have long, woolly, not purplish, hairs. A variety of the former, but not *V. thapsiforme*, Schr. The glabrous filaments are at least six times as long as the decurrent anthers, and the corolla is not much more than twice as long as the calyx, though considerably larger than in *V. Thapsus*. On the Clent Hills, Worcestershire.

V. thapsiforme, Schrader, is described thus:—"Flowers much larger than those of *V. Thapsus*, about four times as long as the calyx." (Compare Babington's "Manual," p. 225.)

2. **V. *Lychnitis***, Linn. White Mullein. E. B. 58, L. C. 741. Stems erect, a yard high, angular, branching above, very downy or cottony, leafy. Leaves nearly glabrous and green above, hoary beneath; root-leaves large, oblong, tapering at the base into petioles; stem-leaves sessile, not decurrent; the floral ones ovate-lanceolate. Pedicels twice as long as the calyx, downy. Flowers in tufts, which are arranged in a lax cluster; and the clusters are in a panicle. Corolla small, white, or cream-coloured. Stamens clothed with long, woolly, white hairs. Anthers orange, reniform. Several parts of Kent, and in some other counties, but very rare. Biennial. July—September.

A. 5, C. 8. Lat. 50°—54° (57°). Alt. 0—200 yards. T. 52°—48° (47°).

Note.—Smith in "Eng. Flora," vol. i., p. 310, tells us that specimens from Denbighshire agree with Link's *V. thapsoides*. This is worth investigation.

3. **V. *floccosum***, Wald. and Kit. *O. pulverulentum*, Sm. Woolly Mullein. E. B. 487, L. C. 742. Stem erect, stout, with spreading branches above, woolly or cottony, the wool or cotton deciduous, and easily rubbed off. Leaves oblong. Root-leaves petioled, tapering at the base. Stem-leaves sessile, not decurrent, the floral leaves amplexicaul, ovate-roundish, abruptly acuminate, woolly or floccose on both sides. Pedicels about as long as the calyx, densely woolly. Flowers in lax, lateral clusters, forming a tapering panicle, the summit of which is the central cluster. Corolla small, yellow. Stamens clothed with white wool. About Norwich. Biennial. June—September.

A. 1, C. 2. Lat. 52°—53°. Alt. 0—50 yards. T. 49°—48°.

4. **V. *nigrum***, Linn. Black Moth Mullein. E. B. 59, L. C. 743. Root thick, perennial. Stem erect, rather robust, usually simple, furrowed, and rigid, hairy or pubescent (woolly). Leaves ovate-oblong, crenulate, green, more or less hairy on both sides; the root-leaves cordate at the base, on long petioles, the upper on shorter petioles, or sessile, not decurrent. Upper bracts very minute, subtending tufts of several flowers, some of which are usually abortive. Pedicels slender, longer than the sepals. Corolla twice as long as the calyx. Stamens with hairy filaments. Anthers reniform. In dry, sandy, or stony places. Perennial. July, August.

A. 7, C. 30. Lat. 50°—54° (56°). Alt. 0—200 yards (300, Clent Hills).

5. **V. Blattaria**, Linn. Moth Mullein. E. B. 393, L. C. 744. Stem erect, rigid, smooth, roundish, with slight elevations, leafy, branched above. Root- and lower leaves sinuate or somewhat lyrate, tapering at the base; stem-leaves cordate, clasping, not decurrent. Flowers *single*, in lax, elongated, simple clusters on pedicels *twice as long as the bracts, and spreading*, beset with glandular hairs. Sepals lanceolate or linear-oblong, glandular. Corolla large, yellow, purple at the base. Capsule globular, wrinkled, glabrous or slightly hairy, but not glandular, as it is in *V. virgatum*. About waysides. Biennial. July—September. \cup^1

The specimen described above was sent from Somersetshire. One of the branches is at least three feet long, and the cluster of flowers and fruit above one-half of this length. It very much resembles *V. virgatum*, which has been collected in several waste parts about Chelsea and Brompton, certainly not wild, but rather springing up from seeds produced by plants previously cultivated in these places. It differs chiefly in the form of the radical leaves which are not like the leaves of the *Primrose*, as those of *V. virgatum* are. The chief difference is in the single flowers on long spreading pedicels, and in the capsule which is not glandular, as that of *V. virgatum* is. Coss and Ger. describe their plant as having solitary or ternate flowers. These able botanists make two varieties; viz., *a. vulgare*, pedicels three-four times as long as the calyx, our *V. blattaria*; and *β . blattaroides*, pedicels not so long as the calyx, a character of our *V. virgatum*.

6. **V. virgatum**, With. Large-flowered Primrose-leaved Mullein. E. B. 550, L. C. 745. Stem stout, tall, branching, often clothed with short glandular hairs, four-six feet high, leafy. Radical leaves *resembling those of a Primrose, but larger*, and more or less lyrate. Stem-leaves oblong-lanceolate, cordate at the base, with large ovate mucronate teeth, all glabrous and wrinkled. Flowers large, axillary, *several together, partly stalked*, the upper ones solitary, bracteate. Calyx hairy, viscid, glandular, with linear segments. Pedicels *shorter than the bracts*. Corolla large, with a purple ring round the throat. Filaments with purple hairs. Fruit globular, thickly covered with erect glandular hairs. Chelsea College, Devonshire and Worcestershire. Perennial(?). August.

A. 5, C. 8. Lat. 50°—54°. Alt. 0—100 yards. T. 52°—48°.

ORDER LX.—**SOLANACEÆ**, Juss. THE NIGHTSHADE FAMILY.

Herbs or shrubs. Leaves alternate, simple or lobed. Calyx five-rarely four-parted. Corolla deciduous, with as many segments as the calyx, bearing five stamens, which have an alternate insertion. Ovary two-celled, rarely four- or many-celled. Fruit either capsular or baccate. Seeds indefinite. The deciduous and usually symmetrical corolla distinguishes this order from the foregoing. The nutritious quality of the potato, *Solanum tuberosum*, is well known.

The species are produced in most parts of the world, but are abundant in the tropical regions.

TRIBE I.—**Solaneæ veræ.** Fruit succulent, indehiscent.

SYNOPSIS OF THE GENERA.

Solanum. Flowers numerous, in corymbs or cymes.

Atropa. Flowers solitary, or in pairs.

I. *Solanum*, Linn. Nightshade. Herbaceous or shrubby plants, mostly intra-tropical. Stem leafy. Leaves alternate, stalked, usually lobed. Flowers solitary or aggregate, in cymes or corymbs. Calyx five-parted, with acute segments. Corolla rotate, with a short tube and a reflexed plaited limb, in five acute segments. Stamens five, with short filaments and oblong, angular converging anthers, which open by terminal pores. Ovary roundish, with a thread-shaped deciduous style and obtuse simple or notched stigma. Fruit a berry, round or ovate, usually two-celled, with a fleshy placenta in each cell. Seeds numerous, embedded in pulp. The reflexed segments of the corolla, the converging angular anthers, and the round-berried fruit sufficiently characterize this genus.

1. ***S. Dulcamara*, Linn.** Woody Nightshade. F. B. 565, L. C. 738. Stem *woody, climbing*, branching. Leaves ovate, petiolate, deep green, glabrous or downy, the upper ones *with two spreading, deeply-parted lobes or segments*. Flowers in branching corymbs on long peduncles. Calyx small, with five short triangular lobes or teeth. Corolla violet, with five ovate-lanceolate divisions, spotted at their base with green spots. Berries ovate, pendulous, *red when mature*. Hedges, woods, riversides. Perennial. June.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.



Fig. 157.—*Solanum Dulcamara*. 1, Portion of plant; 2, flower; 3, section of the same; 4, pistil; 5, vertical section of the ovary, showing the ovary and ovules; 6, horizontal section of the ovary. 4 and 5 slightly magnified.

2. **S. nigrum**, Linn. Black or Garden Nightshade. E. B. 566, L. C. 737. Root *annual*. Stems erect, branching, rough, somewhat hairy. Leaves petiolate, *ovate, pointed, tapering*, rarely cordate at the base, laxly-toothed or sinuate. Flowers pedicelled in trusses or umbels at the end of short round peduncles, three-six. Calyx small, with ovate-triangular segments. Corolla whitish, with ovate-pointed, somewhat fringed lobes (divisions). Fruit globular, of various colours, black, green, yellow, or reddish yellow, on reflexed pedicels. In fields and rubbish-heaps; not rare. Annual. July, August.

A. 11, C. 40. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—48°.

II. **Atropa**, Linn. Dwale, Deadly Nightshade. Herbs or shrubs. Leaves stalked, simple, mostly undivided. Flowers lateral, solitary or aggregate. Calyx deeply five-parted, with acute segments. Corolla campanulate, with a short tube and tumid limb, terminating in five shallow, spreading lobes. Stamens five, inserted into the tube, with cordate, four-lobed anthers. Ovary ovate, with a reclining style and capitate stigma. Fruit baccate, globular, two-celled, with fleshy placentas attached to the transverse partition. Seeds numerous. This very dangerous plant, happily of infrequent occurrence, is distinguished by its bushy growth, dingy-purple, bell-shaped flowers and shining violet-black berries. The demand for preparations from the only indigenous species has recently been so great that the plants are fast disappearing.

A. Belladonna, Linn.' Dwale, or Deadly Nightshade. E. B. 592, L. C. 739. Stems erect, robust, bushy, two-three-forked. Leaves ovate-pointed, narrowed into the petiole, smooth, or clothed with fine down, entire or slightly sinuate. Flowers large, solitary, or in pairs, pedicelled. Berry nearly as large as a cherry, shining, black. Fatal consequences have often followed the eating of this dangerous fruit. Woods and hedges, old ruins, &c. Perennial. June—August.

A. 10, C. 20. Lat. 50°—54°. Alt. 0—200 yards. T. 50°—47°.

In plantations foot of Moncrieffe hill near Perth

TRIBE II.—**Nicotianæ**. Fruit dry, dehiscent (opening).

SYNOPSIS OF THE GENERA.

Hyoscyamus. Fruit opening circularly (a pyx).

Datura. Fruit opening by valves (dehiscence valvular).

III. **Hyoscyamus**, Linn. Henbane. Herbaceous or occasionally somewhat shrubby plants. Stem round, branching. Leaves alternate, sinuate, or angular; whole plant downy, fetid. Inflorescence axillary, solitary. Calyx tubular, five-cleft. Corolla funnel-shaped, with a short tube and rather spreading limb, consisting of five rounded segments, one of which is broader than the rest. Stamens five, with cordate incumbent anthers. Ovary roundish, with reclining style and capitate stigma. Capsule two-celled, opening by a lid. Seeds numerous, on placentas attached to the partition. The unctuous feel,

downy stem and leaves, sessile large flowers, elegantly pencilled with purple veins, and the round capsular fruit readily distinguish this genus. The whole plant has the character of being fatal to poultry. It has recently become a very popular remedial agent either in tincture or in extract.

H. niger, Linn. Henbane. E. B. 591, L. C. 736. Stem stout, erect, branching, with long glandulous hairs. Leaves sinuate, with angular, unequal lobes, downy; the root-leaves petiolate, the stem-leaves clasping. Flowers sessile or on short peduncles, clustered, Calyx-tube hairy or downy, densely cottony at the base, with pointed angular lobes. Seeds reticulate-punctate. Whole plant viscid, with a strong unpleasant smell. Hedges, roadsides, rubbish; not frequent. Barnes Common. Perennial. June.

A 17, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

IV. Datura, Linn. Thorn Apple. Herbs or shrubs. Stems round, branching. Leaves stalked. Inflorescence solitary, lateral, or in the forks of the stem. Calyx tubular, five-angled and five-toothed, part permanent and part deciduous. Corolla funnel-shaped, with a cylindrical tube and moderately spreading limb, with five plaits, five angles, and five shallow pointed lobes. Stamens five, partly united to the tube, with cordate-oblong, compressed anthers. Ovary four-celled, with a central, erect style, and obtuse, two-lobed stigma. Capsule roundish-ovate, four-valved, two-celled, each partially divided, having placentas in each, which bear the numerous kidney-shaped seeds. The dichotomous (two-forked) stems, pliant, smooth, angled leaves, large plaited corollas, and thorny fruit distinguish this genus. One of the least doubtful exotic plants; probably first introduced among the genuine natives by accident, and subsequently it has retained its place in the Flora by right of prescription. No botanist ever admitted its claims even as a naturalized species.

D. Stramonium, Linn. E. B. 1288, L. C., List of Excluded Species. Stem forked, erect, glabrous. Leaves ovate, acuminate, sinuate, angular, with long tapering teeth, petiolate. Flowers solitary in the forks, pedicelled. Calyx tubular, with keeled acuminate lobes. Corolla white, with a long tube and long sharp-pointed lobes. Fruit ovate, spinous, as large as a walnut. Seeds large, black. In gardens and waste rubbishy places. Near Weybridge, Surrey, by the river. Annual. July.

A. 13. Lat. 50°—56°.

ORDER LXI.—**BORAGINACEÆ**, Juss. THE BORAGE FAMILY.

Herbaceous, sometimes shrubby plants, with round stems, and alternate leaves, more or less covered with asperities; and hence the ancient name of the order *Asperifoliæ*. Flowers in one-sided gyrate spikes, or cymes, or racemes, sometimes axillary and solitary. Calyx four- or five-parted. Corolla five-cleft, sometimes irregular. Stamens

equal in number to, and alternate with, the lobes of the corolla. Ovary four-lobed or parted, four-seeded. Fruit four distinct nuts, or fewer by abortion. The rough leaves and nucamentous fruit distinguish this

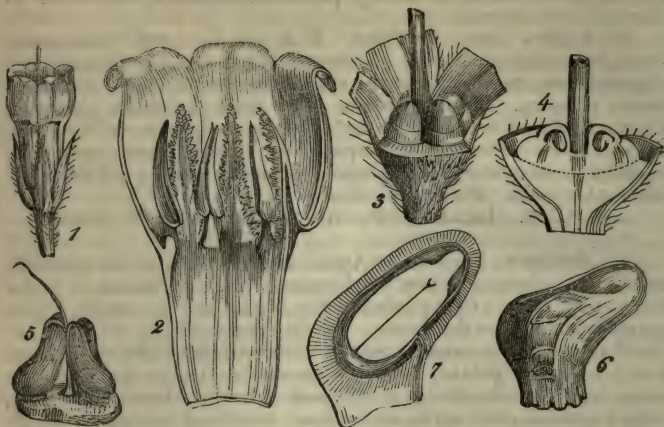


Fig. 158. *Symphytum consolidum* (Juss.). 1, Flower entire; 2, section of corolla, showing the position of the stamens and their appendages; 3, carpels; 4, section of carpels; 5, mature fruit; 6, a single carpel; 7, a section of the same. All magnified except 1.

order. In the latter character it agrees with the *Labiata*, but differs in having a round stem, alternate rough leaves, and five stamens. The species are natives of temperate and warm climates.

TRIBE I.—**Anchuseæ**. Carpels distinct, on a disk, with a flat base, or with a basal ring.

SYNOPSIS OF THE GENERA.

Borago. Annual, very hairy, rough plants, with rotate flowers, on long pedicels, in clusters, forming lax corymbs.

Anchusa. Corolla salver- or funnel-shaped.

Lycopsis. Corolla funnel-shaped, with a short crooked tube.

Symphytum. Corolla tubular, with a bell-shaped limb.

Myosotis. Corolla salver-shaped or rotate, with a short tube, and rounded segments.

Lithospermum. Throat of the corolla open.

Pulmonaria. Calyx tubular, campanulate.

Echium. Corolla funnel-bell-shaped, with five unequal lobes, and open throat.

I. **Borago**, Linn. Borage. Hairy or bristly herbaceous plants, with ovate-lanceolate leaves and numerous paniced handsome flowers.

Calyx five-parted; segments spreading. Corolla rotate, tubular, with a deeply five-cleft limb; segments, ovate, acuminate, flat spreading; mouth surrounded with five obtuse valves. Stamens short, angular, fleshy, with a long external, thick, coloured, erect, round, pointed appendage; anthers linear-lanceolate. Carpels ovate, rugged, or tuberculated, with a very prominent basilar rim. The round, branching, leafy stem, broad leaves, and long, sharp, prickly hairs, but especially the large, handsome, deep-blue flowers, distinguish this genus.

B. officinalis, Linn. Common Borage. E. B. 36, L. C. 861. Stems thick, succulent, erect, much branched, with long, spreading, rigid hairs. Leaves ovate or oblong; the lower ones petioled; the upper sessile, all very hairy, irregularly crenated. Flowers bright blue, on long, reflexed peduncles. Anthers brownish-black, appendages of the stamens violet. Carpels black when ripe, strongly tuberculated, and ribbed, with a prominent toothed basal rim. In rich nitrogenous soils. Annual. July. Naturalized (?).

A. 14. Lat. 50°—58° (?). Alien.

II. Anchusa, Linn. Alkanet. Mostly perennial or biennial, hairy or bristly plants. Stems round, leafy. Leaves acute, mostly sessile. Flowers in clusters. Calyx cylindrical, five-cleft; segments acute. Corolla funnel-shaped, with a straight tube, and a more or less spreading limb; segments rather deep, obtuse; throat closed, with five erect, vaulted, obtuse, hairy, converging scales. Fruit four rough or tuberculated carpels, concave at the base (with prominent basal rim).

1. **A. officinalis**, Linn. Officinal Alkanet. E. B. 662, L. C. 863. Root long, tapering, blackish. Stem one-two feet high, angular, leafy, hairy, branching above. Leaves *lanceolate*, narrow, the root-leaves stalked, the stem-leaves sessile and rounded at the base. Spikes *in pairs*, with ovate bracts. Corolla at first *red*, *changing to purple*, with hairy bluish valves. Seeds wrinkled. Hartley Pans, Northumberland. Perennial. July.

A. 6 (?). Alien.

2. **A. sempervirens**, Linn. Evergreen Alkanet. E. B. 45, L. C. 864. Stems erect, simple, bearing axillary peduncles on their upper half, very rough. Leaves *ovate*, pointed or acuminate, the lower petioled, the upper nearly sessile, very hairy. Flowers not large, *in a head at the summit of the peduncles*. Peduncles round, slender, leafy at the top. Calyx deeply five-parted, with ovate-lanceolate, narrow divisions, very hairy, longer than the tube of the corolla. Corolla salver-shaped, with a short tube; throat with round, hairy prominences, and corresponding depressions. Waste places near ruins; rare. Near Oswestry.—W. P. and A. I. Perennial. June.

A. 17, C. 50. Lat. 50°—58°. Alt. 0—300 yards. T. 52°—45°.

III. Lycopsis, Linn. Ox-tongue. Annual, hairy, very rough

plants. Flowers in terminal clusters. Calyx five-parted. Corolla funnel-shaped, with short, curved tube and five-parted limb, divisions unequal, the throat furnished with five hairy scales. Stamens inserted at the base of the corolla-tube, contiguous to its incurvation, with short filaments. *Carpels with a thick*, very prominent, basal margin. Seeds almost horizontal. The warty, rough surface, the sessile or stem-clasping leaves, usually wavy at the margin, and the clusters of forked, revolute, terminal flowers, with small bracts, which enlarge when the plant is in fruit, distinguish this genus.

L. arvensis, Linn. Ox-tongue. E. B. 938, L. C. 862. Stems erect, branching, warty, succulent. Leaves very rough, oblong-linear, sinuate, wavy; the lower attenuate at the base; the upper sessile, half clasping. Flowers pale blue or whitish, in lax, leafy spikes. Divisions of the calyx lanceolate, shorter than the tube of the corolla, much enlarged in fruit. Corn-fields. Annual. June—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—450 yards. T. 52°—42°.

IV. Symphytum, Tourn. Perennial very rough-leaved plants, with fleshy roots, which abound in mucilage. Flowers drooping, in short terminal and lateral clusters. Calyx deeply five-cleft, with lanceolate teeth. Corolla tubular, with a campanulate-urceolate limb (the limb or bell is contracted, not enlarged, at the mouth); throat closed with five lanceolate, subulate, connivent scales. Stamens included. Carpels wrinkled, with a prominent thick basal ring.

1. **S. officinale**, Linn. Common Comfrey. E. B. 817, L. C. 859. Root thick and fleshy. Stems ascending, stout, angular, winged, rough and hairy, *two-three feet high*. Root-leaves large (often a foot long), *ovate-acute or ovate-lanceolate*, on long petioles; *stem-leaves decurrent* (hence the winged stem), sessile. Corolla white, yellowish, or reddish violet, with triangular, short, reflexed lobes. Scales included. Anthers long. In meadows, near rivers and ditches. This plant is very common in England. Perennial. June—October.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

Var. **S. patens**, Sibth. Calyx spreading, shorter than the tube of the corolla. Caversham. This variety is not rare. It is easily distinguished from the typical form by its purple flowers.

2. **S. tuberosum**, Linn. Tuberous-rooted Comfrey. E. B. 1502, L. C. 860. Root tuberous (knobby), white on the outside (the root of *S. officinale* is black externally). Stems erect, simple or nearly so (not half so long as they are in the above species, scarcely winged). Leaves *ovate-oblong, tapering below, slightly decurrent*. Flowers fewer than in the preceding, pale white, with a yellowish tinge. Moist and shady places. Perennial. June, July. Not rare in Scotland, where it takes the place of *S. officinale*, which in its turn is the common species in England.

A. 12, C. 25. Lat. 51°—58°. Alt. 0—200 yards. T. 49°—47°.

V. *Myosotis*, Linn. Scorpion-grass. Annual or perennial, hairy or bristly plants. Leaves entire. Flowers circinate, spicate or gyrate. Calyx five-cleft or toothed, with acute erect segments. Corolla salver-shaped, with a cylindrical tube and spreading or horizontal limb in five obtuse lobes, twisted in æstivation, throat closed with five rounded convex scales (valves). Fruit invested with the closed calyx. Nuts pointed, smooth, with a small hollow at their base. The round, often ascending or erect stems, the sessile (stalkless) leaves almost all uniform, and the small, elegant, bright blue flowers characterize this genus.

SECT. I.—*Paludosæ*. Aquatics or palustrals. Calyx furnished with short adpressed hairs.

1. ***M. palustris*, With.** Forget-me-not. E. B. 1973, L. C. 847. Root creeping, oblique or vertical, with numerous fibres. Stems reclining, rooting at the base, angular below, usually much branched, rough and rigid, with spreading hairs near the base, and appressed hairs towards the top. Leaves sessile, oblong or lanceolate, obtuse or pointed; the root-leaves tapering into petioles. Calyx five-toothed or cleft. Corolla large, with a flat limb and yellow throat, with rounded lobes and five linear, prominent, cartilaginous processes, which are alternate with the five deeply yellow prominences which surround the orifice. Style and stamens shorter than the tube. Banks of rivers, ditches, marshes, &c. Biennial or perennial (?). May, June.

A. 16, C. 75. Lat. 50° — 57° (58°). Alt. 0—200 yards. T. 52° — 47° .

Var. *M. strigulosa*, Reich. Teeth of the calyx triangular or triangular-lanceolate; hairs (bristles) appressed; pedicels rather shorter than, or nearly equal to, the length of the calyx.

2. ***M. repens* (?), Don.** *M. secunda*, Murray. "Northern Flora," p. 115. E. B. 2703, L. C. 848. Stems stout, round, procumbent or ascending, rooting at the joints and also below the leaves, hairy, hairs long and spreading, hairs on the upper part of the stem appressed (not appressed in specimens from the meadow at Little Chelsea), leafy. Leaves oblong, tapering below, ciliated at or near the base; the upper side of the leaves and the upper part of the stem have appressed hairs. Panicle branched, clusters leafy, near the base. Calyx ovate, slightly constricted above the base, deeply divided, calyx-lobes ovate, nearly half as long as the calyx-tube, with closely appressed hairs. Limb of the corolla flat or slightly reflex, longer than its tube. Style not longer than the calyx, flowers nearly as large as in *M. palustris*, but paler in colour. Marshy places. Perennial. July, August.

A. 18, C. 75. Lat. 50° — 59° (61°). Alt. 0—700 yards. T. 50° — 40° .

3. ***M. cæspitosa* (?), Schultz.** E. B. 2661, L. C. 849. Stem and leaves smaller than in the form named *M. repens*, also with spreading hairs at the lower part of the stem, and the leaves are fringed at or near the base. The raceme is quite simple, unilateral, and the pedicels are much longer than the calyx. The latter is scarcely constricted above the base, and the hairs are minute and few on this part. Calyx deeply cleft; segments lanceolate, blunt, more or less

spreading. The corolla is concave in its limb, and the latter is not longer than its tube. Segments of the corolla blunt, spreading, flat. The carpels are ovate, convex on both sides, with a rim, and are smooth and shining. Marshy places. Meadow at Walham Green, August 18. Perennial. July, August.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—350 yards. T. 50° — 43° .

Note.—*M. cæspitosa* and *M. strigulosa* are scarcely distinct from *M. palustris* as species. The former differs from *M. palustris* chiefly in the size of the corolla, which is very much smaller, with entire lobes; the latter, *M. strigulosa*, differs chiefly in the pubescence of the stem being appressed. In the memory of living botanists there was but one recognized British species of *Myosotis*, viz., *M. scorpioides*, and under this there were several well-known varieties: for example, *B. myosotis*, *scorpioides latifolia hirsuta*; γ . *M. scorpioides hirta minor*; and δ . *M. scorpioides palustris*, the former name of our plant, which has now been enlarged into *M. palustris*, *M. repens*, *M. cæspitosa*, *M. strigulosa*, with the varieties *lingulata*, &c.

SECT. II.—*Sylvaticæ*. Hairs or bristles of the calyx hooked, spreading, or reflexed.

4. **M. sylvatica**, Ehrh. Wood Mouse-ear. E. B. 2630, L. C. 851. Stems solitary or several, erect, much branched, deeply sulcate below, round and tapering above, with long spreading hairs, leafy, with barren shoots. Root-leaves and leaves of the barren shoots oblong-elliptical, hairy, on long petioles; leaves of the stem sessile, cordate, rough with tubercles and rigid. Flowers in very long clusters, gyrate (coiled up in prefloration), axis straight when in fruit; pedicels slightly spreading, longer than the calyx. Calyx rounded below, with five deep, lanceolate, slightly-keeled segments, with fine spreading more or less hooked bristles closed on the fruit. Corolla large, deep blue, with a horizontal limb, which is longer than the tube. Fruit ovate, with a rim and triangular beak, convex and shining on one side and ridged and opaque on the other. Woods and shady places. Perennial. June.

A. 15, C. 40. Lat. 50° — 57° (58°). Alt. 0—200 yards. T. 49° — 47° .

5. **M. suaveolens**, Kit. *M. alpestris*, Sm. and L. C. 850. Rock Scorpion-grass. E. B. 2559. Roots fibrous, tufted, slightly creeping. Stems several, erect, simple, hairy, leafy, five-ten inches high. Root-leaves on long stalks, oblong, pointed. Stem-leaves sessile, oblong-lanceolate, very hairy, hairs of both stem and leaves spreading, long, white. Flowers in round branching clusters (compound panicles), on longish, hairy or silky stalks. Calyx deeply divided, segments linear-lanceolate, covered with erect, adpressed straight hairs. Corolla intense, blue, much longer than the tube, as large as in *M. palustris*, with rounded entire segments which are slightly reflexed, and with a small protuberant greenish eye. On the summits of Highland mountains, rocks on Ben Lawers, &c.

A. 1, C. 1. Lat. 56° — 57° . Alt. 1050—1300 yards. T. 37° — 34° .

6. **M. intermedia**, Link.; *arvensis*, Hoff. and L. C. 852, E. B.

2629. Stems solitary, or more or less numerous, rigid, erect, simple or branched, hairy. Root-leaves obovate or oblong, tapering into a petiole; upper leaves ovate-lanceolate, sessile. Flowers distant, the lower on long, spreading pedicels, which are twice as long as the calyx. Calyx deeply parted, shut when in fruit, bristly; bristles spreading, hooked. Corolla small, blue; throat yellow, with yellow, rounded scales; the tube not longer than the calyx. In fields; not uncommon. Annual. May—July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—43°.

7. **M. versicolor**, Ehrh. Yellow and Blue Mouse-ear. E. B. 480, L. C. 854. Stems several, from the crown of the same root, branching, erect, round, tapering, hairy, leafy, hairs spreading. Leaves oblong, narrow, somewhat acute (elliptical or oblong, sessile or half-clasping). Flowers in long terminal clusters, which are often in pairs, especially in luxuriant forms. Pedicels ascending more or less twisted to one side, shorter than the calyx. *Calyx closed in fruit*, armed with spreading hooked bristles, teeth longer than the tube, divided to within one-third of its length from the base (near the base). Limb of the corolla concave, shorter than the tube. Fruit ovate, with a very narrow rim and short beak, convex and shining on both sides. Flower paler, bluish or whitish (pale blue, diluted with yellowish white). Tube of calyx longer and not so round at the base, as in *M. collina*, with longer teeth, on pedicels shorter than the calyx; bristles as in *M. collina*. Corolla not concave, but with erect or spreading lobes. Banks and meadows. Annual. May, June.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—42°.

8. **M. collina**, Hoffm. Dwarf Mouse-ear. E. B. 2558, L. C. 853. Stems erect or reclining at the base, branching, hairy. Lower leaves oblong-obovate, half-clasping, upper lanceolate, all clothed with long, straight hairs. Clusters mostly solitary, with a distant flower; pedicels diverging, about as long as the calyx. *Calyx open when in fruit*, with spreading hooked bristles. Limb of the corolla concave, shorter than the tube, bright blue. Fruit ovate, without any rim or beak, about equally convex on both sides, shining. Dry banks. Annual. May.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

Note.—In *M. collina* the herbage is softer than in the above. Stems not quite so tall nor the leaves so long and narrow as in *M. versicolor*. The calyx is somewhat more ventricose and less deeply divided. Hairs of the calyx hooked; pedicels longer than the calyx, which is rather longer than the tube of the corolla. The corolla is of a deep blue and never yellow.

VI. **Lithospermum**, Linn. Gromwell. Erect, rigid, hairy. Rough or bristly plants. Flowers in leafy spikes or clusters. Calyx in five deep segments, nearly upright, with linear divisions. Corolla funnel-shaped, tubular; limb cleft into five obtuse erect segments. Throat naked, or with very minute scales, stamens included. Carpels

very hard (like a stone), either polished or wrinkled, pointed, with a flat base.

1. **L. arvense**, Linn. Field Gromwell. E. B. 123, L. C. 856. Stem round, erect, slightly branched from the base, rigid, with rough short hairs. Leaves oblong-linear or *lanceolate*, thick, midrib only prominent, the lower leaves oblong, tapering into the petioles, all rough, with white adpressed hairs. Corolla *small, white*, but little longer than the calyx, hairy on the outside, throat with five downy elevations (lines). Carpels *brown, tubercular*. Corn-fields. Annual. May—July.

A. 18, C. 75. Lat. 50°—59°. Alt. 0—200 yards. T. 52°—46°.

2. **L. officinale**, Linn. Common or Official Gromwell. E. B. 134, L. C. 855. Stems erect, stout, round, rigid, rough, with appressed bristles which point upwards. Leaves oblong-pointed or lanceolate, with a prominent midrib and appressed bristly hairs. Corolla small, whitish, *rather longer than the calyx*; throat with five small downy scales. Carpels *smooth, pearly, shining*, very hard. Bushy, grassy places. Perennial. July.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

3. **L. purpureo-cœruleum**, Linn. Purple Gromwell. E. B. 117, L. C. 857. Roots woody, blackish. Barren stems round, procumbent, leafy and bristly, fertile stems erect, many-flowered. Leaves lanceolate, pointed, alternate, contracted at the base. Spikes erect, terminal. Calyx-segments narrow. Corolla large, violet blue, with rather narrow, ovate, blunt segments; the tube is not quite closed by the protuberances. Seeds polished. Very rare. Darent Wood, near Greenhithe. Perennial. May.

A. 3, C. 4. Lat. 50°—52°. Alt. 0—100 yards. T. 51°—49°.

4. **L. maritimum**, Lehmann. *Mertensia maritima*, Don. E. B. 368, L. C. 858. Whole herbage rough, with callous dots, fleshy and glaucous. Stems procumbent, branched. Lower leaves ovate, stalked; upper leaves lanceolate, sessile. Flowers large, beautiful, purplish blue; tube of the corolla short. Sea-shores. Rare. Perennial. May, June.

A. 8, C. 25. Lat. 53°—61°. Alt. 0. T. 49°—45°.

Many years ago I observed this very conspicuous plant on a sandy part of the shore of the Southampton Water, not far from Netley Abbey. Its range should include Hants. In Scotland I never observed more than a single plant at any one part of large spaces of sandy coast.—A. I.

VII. **Pulmonaria**, Linn. Lungwort. Perennial hairy plants of low growth. Flowers in erect, terminal, corymbose clusters. Calyx five-angled and five-toothed. Corolla funnel-shaped, tube cylindrical, limb spreading, segments rounded, throat open, no scales. Carpels roundish, hairy, stony, base flat, with a central tubercle. The soft texture of the whole plant, its often spotted leaves, the bright coloured small flowers, and the stony nuts, distinguish this genus.

1. *P. officinalis* Linn. *La. P. 440*

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Root-leaves oblong, stalked; stem-leaves narrow, oblong-lanceolate, *cordate and clasping at the base*. Flowers large, purplish blue, in elongated, slender, lax spikes. Divisions of the calyx long, linear-lanceolate, ciliate. Corolla irregular; stamens very unequal. Jersey. Biennial. June.

Sarnian (Channel Islands.)

TRIBE II.—**Cynoglosseæ**. Carpels contiguous at their apex, attached to the central column by a lateral, flat, or almost flat, surface.

SYNOPSIS OF THE GENERA.

Cynoglossum. Calyx five-cleft or parted. Carpels with spinous tubercles.

Asperugo. Calyx enlarged when in fruit. Carpels shagreened.

IX. **Cynoglossum**, Linn. Hound's-tongue. Biennial, rarely perennial, plants. Leaves lanceolate, acute. Whole herbage downy, hairy or warty. Flowers racemose. Calyx five-cleft or five-parted, segments oblong. Corolla funnel-shaped, with a short tube and five-cleft limb; segments rounded, throat closed with five horizontally converging convex scales. Stamens included. Style stout, persistent. Carpels depressed, clothed with rough-hooked prickles, all attached to the central column (style), on the upper part of it. The erect stems, long narrow leaves, and rather numerous clusters of small flowers distinguish this genus.

1. **C. sylvaticum**, Hænke. Wood Hound's-tongue. E. B. 1642, L. C. 867. Stems erect, branching at the summit, rough, with long hairs and prominent lines. Leaves ovate or oblong, attenuated into a long petiole; the upper ones sessile, half-clasping, *shining and somewhat glabrous above*, rough and downy below. Pedicels shorter than the calyx. Divisions of the calyx linear or lanceolate. Corolla blue violet. Spines of the carpels contiguous on both the sides and borders. Shady places. Epping Forest; road to Dorking, near Box-hill. Biennial. June.

A. 3, C. 10. Lat. 51° — 52° . Alt. 0—100 yards. T. 49° — 48° .

2. **C. officinale**, Linn. Common Hound's-tongue. E. B. 921, L. C. 866. Stems stout, erect, leafy, branching at the top, downy and soft. Leaves *hoary on both sides, downy*, soft, fetid when rubbed; root-leaves large, oblong, on long tapering petioles; upper leaves lanceolate, often very narrow, sessile, and clasping. Calyx covered with a silky down; divisions ovate, lanceolate, blunt. Carpels round, compressed; spines on the upper side rather distant, contiguous on the under side and borders. Banks and hedges. Biennial. June.

A. 15, C. 60. Lat. 50° — 57° (60°). Alt. 0—200 yards. T. 51° — 47° .

X. **Asperugo**, Linn. Madwort. Prostrate herbs, with axillary blue flowers. Calyx five-cleft; segment subsequently enlarged into two erect, toothed, veiny lobes, much developed in fruit, compressed into two flat angular-toothed valves, applied to each other. Corolla funnel-shaped, with a very short tube, and spreading five-cleft

limb; segments rounded; throat nearly closed by five convex valves, converging horizontally. Stamens short, concealed by the valves. Fruit compressed laterally, shagreened, imperforate at the base, laterally attached in pairs to a central column formed of the lower part of the style. The prostrate habit, bristly integuments, and axillary blue flowers determine this genus.

A. procumbens, Linn. Trailing Madwort. E. B. 661, L. C. 865. Stem slender, spreading, prostrate, usually branching from the base; angles rough (hispid), with strong reflexed prickles. Leaves elliptic-oblong, thin, nearly opposite, contiguous, in twos or threes, oblong, narrowed at the base, ciliated, rough. Flowers small, on very short pedicels, axillary, though apparently opposite to the leaves. Calyx two-lipped, with triangular teeth, closed, when in fruit reflexed. Corolla small. Carpels compressed. Waysides, rich waste ground. Wandsworth steam-boat pier. Annual. June.

A. 5, C. 7. Lat. 51°—58°. Alt. 0—50 yards. T. 45°—47°.

ORDER LXII.—**CUSCUTACEÆ**, Lind. THE DODDER FAMILY.

Twining, parasitical, herbaceous, leafless plants, with racemose flowers. Calyx and corolla persistent, four-five-cleft or parted, imbricated in æstivation (prefloration). Ovary consisting of two cells, with two erect ovules in each. Fruit capsular, bursting transversely. Styles two, sometimes one by cohesion. Stamens equal in number to the segments of the corolla, and alternate with them. Anthers two-celled, opening longitudinally. Seeds albuminous, with a spiral acotyledonous embryo. The plants of this order are very obviously distinguished by their delicate structure, by the absence of leaves, the twining, parasitic stems, and by their little clusters of minute flowers. They are all annual, and the root generally perishes when the parasite has established itself on a plant suitable for its growth. It is destructive or very injurious to the plants on which it grows.

Cuscuta, Linn. Dodder. Calyx cup-shaped, with a fleshy base. Corolla with an elliptical or cylindrical tube and spreading limb, somewhat urceolate or campanulate, the throat generally closed with scales, which are attached to its interior base, and alternate with its segments. Ovary roundish. Capsule membranous, bilocular, sometimes monospermous by abortion. Stigma simple or capitate. Stamens erect, shorter than the limb of the corolla, with roundish two-lobed anthers. Twining, thread-shaped (filamentous), or capillary (hair-like), alternately branched stems. Flowers pale, each provided with a bract, and arranged in sessile (sitting) lateral heads or clusters.

1. **C. europæa**. Greater Dodder. E. B. 378, L. C. 732. Stem thread-shaped, much branched. Calyx reddish. Corolla campanulate

and subsequently globose, *five-cleft*, considerably larger than the calyx. Styles short, spreading, with acute stigmas. Parasitical on leguminous plants, Hops, Brambles, Nettles, &c. Osierholt, St. Catherine's, near Guildford.—A. I. Annual. August, September.

A. 8, C. 25. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—48°.

2. **C. Epilinum**, Weihe. Flax Dodder. E. B. 2850, L. C. 733. Stem thread-shaped, nearly simple. Calyx nearly as long as the corolla. Corolla *ventricose*, with *two-lobed fimbriated scales*. Styles erect, subsequently diverging, with converging stigmas. Parasitical on Flax. Field near Thaxted, near Saffron Walden. *Annual July*.

A. 10, C. 20. Lat. 51°—58°. Alt. 0—200 yards. T. 50°—47°.

3. **C. Epithymum**, Sm. Lesser Dodder. E. B. 55, L. C. 734. Stem capillary, red or purplish, very much divided, twisted and entangled. Calyx campanulate, *four-cleft*, not so long as the corolla. Corolla with a short funnel-shaped tube and *four-cleft*, spreading limb, with acute segments. Stamens equal to,

Fig. 159.—*Cuscuta europæa*. 1, Portion of plant with clusters of flowers; 2, a single cluster, detached and magnified; 3, a single flower; 4, section of the same; 5, section of ovary; 6, seed.

or longer than, the tube of the corolla. Scales large, converging, closing the tube. Style longer than the ovary. Stigmas linear, deep red. Heaths and open places, on Heath, Furze, Ling, Thyme, &c. Annual. July, August.

A. 10, C. 25. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—48°.

4. **C. Trifolii**, Babington. Clover Dodder. E. B. 2898, L. C. 735. Stem thread-like or capillary, very much branched, and in this respect like *C. Epithymum*. Calyx *as long as the tube of the corolla*, fleshy, with lanceolate segments. Corolla with a cylindrical tube, furnished with fimbriated converging scales. Anthers apiculate. Parasitical on Clover, Rib-grass, Scabious, &c. Rottingdean (?), near Brighton, 1837.—A. I. Guildford, Surrey, on Clover. Too abundant in Kent and Essex in 1857.

1 A. 10, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—48°.

5. *C. hassiaca*, Koch. Lucern Dodder. A species either new or hitherto confounded with *C. europæa*. Stem branching, of a lively orange colour. Flowers pedicelled in fascicled racemes. Corolla with a cylindric tube and five-cleft spreading limb, and the throat closed by converging scales. Segments of the limb inflexed, with a rigid apex. Styles two, with capitate stigmas. Parasitical on May-weed, Sow-thistle, Lucern, &c. Discovered by Mr. E. G. Varenne, in a field of Lucern belonging to Mr. Shoolbridge, Witham, Essex. Description and locality from the "Phytologist," for November, 1851, vol. iii., p. 381, 382.

For an account of several species of *Cuscuta* compare "An. and Mag. Nat. Hist.," No. 102, 1845. "Phytologist," vol. ii., p. 481.

ORDER LXIII.—**CONVOLVULACEÆ**, Br. THE BIND-WEED FAMILY.

Herbaceous plants or shrubs, usually with twining stems. Leaves exstipulate, alternate, simple, lobed, rarely pinnatifid. Flowers axillary or terminal, on one or many-flowered, bracteated peduncles



Fig. 160.—*Convolvulus sepium*. 1, Entire flower; 2, pistil; 3, section, showing the ovary and disk; 4, fruit wrapped in the calyx; 5, fruit with the calyx removed; 6, transverse section of the fruit; 7, the seed; 8, section of seed, showing the curved embryo and endosperm.

Calyx five-parted, with imbricated segments. Corolla with a plaited, five-lobed limb. Stamens equal to, and alternate with, the lobes of

the corolla. Style one, usually divided; ovary two-four cells, rarely one. Fruit capsular, one-four-celled, valvular. Seeds containing a small quantity of mucilaginous albumen, with curved embryo and shrivelled cotyledons. The British species of this order are all herbaceous, and abound in hedges and cultivated fields, twining round shrubs and herbaceous plants, both when ascending or when creeping along the ground. Their roots abound in an acrid, milky, strongly purgative juice. Jalap, Scammony, and other aperient drugs are extracted from certain species, dietary articles from others. Many of them are highly ornamental. They are very abundant in the tropical and warm regions, and but a few species are found in cold climates. The few indigenous to this country are easily known by their habit, habitat, and their large, showy flowers.

Convolvulus, Linn. Bindweed. Stems in the British species herbaceous, leafy, twining or trailing. Leaves alternate, petiolate. Segments of the calyx ovate, converging. Corolla campanulate, with five lobes and five prominent plaits. Stamens half as long as the corolla, with erect, sagittate anthers. Style filiform, as long as the stamens, with two oblong, spreading stigmas. Ovary roundish, capsule invested with the persistent calyx, with valvular or irregular dehiscence. Seeds large, two in each cell. The British species of this genus are easily known by their twining or trailing leafy stems, by their showy flowers and their habitats. The root of *C. sepium* has been used as a purgative, being similar in its properties to the well-known Scammony.

1. **C. arvensis**, Linn. Small Bindweed. E. B. 312, L. C. 729. Stems numerous, angular, twining or trailing, not much branched. Lower leaves *elliptical-oblong*, upper sagittate with tapering bases, on petioles shorter than the leaves. Peduncles bracteate at about two-thirds of their length from their base, bearing one, rarely two, flowers. Divisions of the calyx truncate or cordate at the apex, with very short points. Corolla rosy or white, with five deeper-coloured, broad, tapering streaks on the outside. Fruit ovate-roundish, with a point. Seeds tubercled. Abundant in corn-fields, either prostrate or twining up the corn-stalks. The flowers are very beautiful, exhibiting many shades of pink, with crimson stains, and paler, yellowish plaits. They are hygroscopic, always closing before rain. Perennial. June—August.

Var. *B. C. hirtus* (Koch). Stem-leaves downy.

A. 16, C. 60. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

2. **C. sepium**, Linn. Great Bindweed. E. B. 313, L. C. 730. Stem round, twining, glabrous, leafy. Leaves *cordate-sagittate*, with *sinnate rather than truncate lobes*. These two triangular-pointed lobes are separated by the long and shallow sinus. Bracts cordate, with a purplish margin, entirely covering the calyx. Calyx ovate-membranous, with ovate-triangular lobes. Flowers white, large, solitary, axillary, on stout, furrowed peduncles, which are longer than the petioles. Corolla with five greenish, striated bands. Stamens

dilated, glandular at the base. This plant is easily distinguished by its white, rarely pinkish flowers, its large leaves and climbing habit. It is found in moist hedges, osier-holts, and thickets. Perennial. July—September.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

Note.—We botanized in Scotland from Edinburgh by Stirling, and through the Perthshire Highlands by Callander, Kilin, and along the valley of the Tay to Perth, but we only saw one of these plants at Taymouth, where it appeared to be cultivated.

3. **C. Soldanella**. Linn. Sea Bindweed. E. B. 314, L. C. 731. Stems numerous, procumbent, short, somewhat succulent. Leaves reniform, slightly angular, blunt at the apex or retuse, mucronate, on petioles twice as long as the leaves. Peduncles angular, long and swelling upwards, with ovate bracts, rather shorter than the calyx, quite close to it. Flowers few, as large as the last. This species is easily recognized by its habitat, sandy sea-shores, by its prostrate habit, its succulency, and especially by its delicate, purplish, pink large flowers, which expand only in the sunshine, and are of short duration. Perennial. June, July.

A. 11, C. 25. Lat. 50°—57°. Alt. 0. T. 52°—48°.

ORDER LXIV.—**POLEMONIACEÆ**, Lind. THE GREEK VALERIAN FAMILY.

Herbaceous plants, with opposite, sometimes alternate, compound or simple leaves. Calyx five-parted, sometimes irregular. Corolla five-lobed, rarely irregular. Stamens five, alternate with the lobes of the corolla. Ovary three-celled. Style simple, with a three-cleft stigma. Capsule three-valved, three-celled, with septifragal dehiscence, few- or many-seeded. The single British representative of this order is easily distinguished by its upright angular stem, compound leaves, and irregular corolla. Many of these plants, as *Phlox*, *Cobæa*, *Collomia*, &c., are showy border flowers. They abound in the north-west of America.

Polemonium, Linn. Greek Valerian. Jacob's Ladder. Herbaceous plants, usually with pinnate leaves. Flowers in terminal panicles. Calyx cup-shaped, five-cleft, with broad segments. Corolla rotate, with a short tube, closed at the throat by five downy valves. Limb large, spreading, in five deep, obtuse, equal segments. Stamens five, inserted into the tube, opposite to the segments, and alternate with the valves which close the orifice. Anthers oblong, roundish after bursting. Ovary ovate, pointed. Stigma in three revolute segments on a cylindrical style. Capsule ovate, with three blunt angles, three cells, and three valves. Seeds numerous, attached to the inner angle of the cell. This single British species of the order and genus is probably of American origin. As a naturalized plant of this island, its claims are unquestioned, though the original cause of its introduction be only matter of speculation. It was probably in this country long before America was discovered.

P. cœruleum, Linn. Jacob's Ladder. E. B. 14, L. C. 728. Stems erect, angular, slightly winged, glabrous, branched at the top. Leaves compound, of numerous, lanceolate-pointed leaflets; lower leaves petioled, upper sessile. Flowers large, bluish, or pale white, in compound panicles. Segments of the calyx ovate, pointed. Fruit nearly globular. Mountainous limestone, shady places. Perennial. July.

A. 3, C. 3. Lat. 53°—55°. Alt. 150—300 yards. T. 46°—45°.

ORDER LXV.—**GENTIANACEÆ**, Juss. THE GENTIAN FAMILY.

Herbaceous, usually smooth plants, containing bitter juice, rarely shrubs. Leaves entire, generally sessile,

generally sessile, exstipulate, opposite, usually three-five-ribbed. Flowers terminal or axillary, in cymes or clusters, corymbs or tufts, or solitary. Calyx variously divided. Corolla persistent, with as many segments as the calyx. Stamens equal in number to the segments, and alternate with them. Ovary one- or two-celled, with many ovules. Fruit capsular, opening by two valves, with numerous small seeds. Albumen fleshy. Radicle towards the hilum. The habit, four-angled stem, structure and position of the leaves will serve to identify most of the British species belonging to this order. They all possess intensely bitter properties, and are tonic, stomachic, and febrifugal.



Fig. 161.—*Erythraea Centaureum*. 1, Plant, upper part of; 2, flower; 3, section of the same; 4, pistil, showing the ovary, style, and stigmas; 5, transverse section of ovary; 6, capsule in the calyx; 7, capsule removed from the calyx, opening.

Many are prized for their beauty. They are found both in cold and warm regions.

TRIBE I.—**Menyanthes**. Corolla induplicate-valvular in prefloration.

SYNOPSIS OF THE GENERA.

Menyanthes. Leaves trifoliate, petiolate.

Villarsia. Leaves roundish-cordate, swimming.

I. Menyanthes, Linn. Buckbean. Herbaceous bog plants, with very vascular smooth stems. Leaves ternate. Flowers racemose, on upright, round peduncles. Calyx five-cleft. Corolla tubular, with a five-cleft limb, and more or less pointed, hairy segments, rosy-white, bracteate. Stamens five, with erect, cleft anthers. Ovary conical, with a filiform style, and a lobed or notched stigma. Fruit capsular, one-celled, two-valved, with numerous seeds attached to the axis of the valves. The only British plant of this genus is readily distinguished by its habitat, its creeping stem, trifoliate leaves, and beautiful spike of rose-coloured flowers. It is one of the very handsomest of our native species.

M. trifoliata, Linn. Bogbean (Buckbean). E. B. 497, L. C. 727. Rhizome thick, whitish, with membranous sheaths, which leave annular marks (cicatrices) when they decay. Leaves trifoliate, springing either from the summit of the rhizome, or from the ramifications, on long petioles; leaflets oblong or obovate, entire or slightly crenulate. Peduncles cylindrical, stout. Pedicels longer than the bracts. Divisions of the calyx lanceolate, obtuse, scarcely half the length of the tube of the corolla. Divisions of the corolla lanceolate, pointed or tapering, reflexed, covered internally with long filiform, petaloid white hairs. Style persistent. Capsule somewhat globular. Seeds large, ovate, compressed, with a yellowish, thick, shining, very hard shell. In water, and in wet, boggy places. Perennial. May, June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—600 yards. T. 52°—41°.

II. Villarsia, Gmel. Yellow Buckbean. Aquatics. Leaves swimming, the lower alternate, the upper opposite. Flowers yellow, in axillary tufts. Calyx five-parted. Corolla almost rotate, with a short tube, bearded in the throat, five-parted. Stamens five. Style filiform. Stigma two-lobed. Glands five, alternate with the stamens. Fruit capsular, one-celled, many-seeded, bearing the seeds on the margins of the valves. Seeds flat, almost membranous, ciliated.

1. W. nymphæoides, Vent. Fringed Buckbean, or Yellow Water Lily. E. B. 217, L. C. 726. Stems branching, submersed, variable in length, which depends on the depth of the water in which they grow. Leaves roundish, deeply cordate, with contiguous lobes, very entire, leathery, on longer or shorter petioles, which enlarge at the base, and form a membranous sheath. Flowers deep yellow, on long peduncles. Calyx deeply-parted, with lanceolate divisions, longer than the tube of the corolla. Divisions of the corolla obovate, ciliated. Style persistent. Capsule ovate, acuminate, compressed.

Seeds flat, with a ciliated margin. Rivers, where the current is very gentle; ponds, &c. This plant has been introduced into several ponds in Surrey and Hants: for example, Wandsworth Common and near Upton, Ryde, Isle of Wight. Perennial. June, July.

A. 4, C. 12. Lat. 50° — 53° . Alt. 0—50 yards. T. 50° — 48° .

TRIBE II.—**Gentianeæ**. Leaves simple; corolla twisted in pre-floration.

Genera.—*Erythræa*, *Gentiana*, *Cicendia*, *Chlora*.

SYNOPSIS OF THE GENERA.

Erythræa. Anthers spirally twisted after the emission of the pollen.

Gentiana. Plants more or less robust. Flowers large. Stigma cleft.

Cicendia. Plants slender. Flowers small. Stigma lobed.

Chlora. Calyx and corolla six-eight parted. Stamens six-eight.

III. **Erythræa**. Centaury. Stems quadrangular. Leaves simple, undivided, entire. Calyx monosepalous, in five long, acute segments. Corolla tubular, with a salver-shaped limb in five segments. Stamens five, with oblong anthers, *which twist spirally as the pollen ripens*. Ovary nearly linear, compressed, with a cylindrical, straight, prominent style, and two roundish stigmas. Fruit capsular, imperfectly two-celled, two-valved, with inflexed margins. Seeds numerous, in two rows. The chief distinctive marks of these plants are the erect round style and the spirally twisted anthers. Like *Gentiana*, they possess tonic properties.

1. **E. Centaureum**, Pers. Common Centaury. E. B. 417, L. C. 724. Stem quite erect, ten-eighteen inches high, with four prominent lines and opposite branches. Leaves (radical ones obovate in a rosette) ovate or oblong. Flowers deep pink, in contiguous cymes, forming corymbs, on *very short pedicels*, terminal. In woods, pastures, and other moist places. There is a white variety, which is rare. Biennial. July—September.

A. 18, C. 80. Lat. 50° — 61° . Alt. 0—200 yards. T. 52° — 45° .

2. **E. pulchella** (?), Fries. Stems erect, either much branched from the base or quite simple, two-three inches high. Root-leaves few; stem-leaves ovate, the uppermost oblong-lanceolate. Flowers all stalked, the lateral or lower on long pedicels, the upper on short ones. Lobes of the calyx quite as long as the tube of the corolla, just about the time when the latter expands, a little shorter after expansion. Corolla of a beautiful pink colour. All the parts of the plant are smaller and more delicate than in *E. Centaureum*. Isle of Wight, near Sconce Point, Yarmouth. The plant above described abounds in the Isle of Wight, along the north coast, both west and east of Yarmouth. It varies very much in size, viz., from an inch to nearly two feet. When small, the stems are mostly simple, when large, the plant is very bushy and spreading, the stems throwing out branches almost close to the base. Annual. July—September.

I believe this is *E. pulchella* as described by Smith, "Eng.

Flor.," vol. i., p. 322; and I suspect it is only a variety of *E. Centaureum*.—A. I.

A. 10, C. 25. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—48°.

3. *E. latifolia*, Sm. Broad-leaved Centaury. E. B. 2719, L. C. 724 d. Stems simple or branching from the base, stout, angular, winged and furrowed, two-four-inches high (twelve inches?). Root-leaves obovate. Stem-leaves broad, oblong, obtuse, the lower with five prominent ribs. Flowers in dense, leafy tufts, nearly sessile. Divisions of the calyx linear-setaceous, about half as long as the tube of the corolla. Lobes of the corolla elliptical. Sea-shores, Lancashire. Annual. July.

A. 7 (?). One of the *obscuriores*.

4. *E. linariæfolia*, Pers. *E. littoralis*, Sm. Toad-flax-leaved Centaury. E. B. 2305, L. C. 724 b. Stem simple or branching, solitary or several, from the same root, two-six inches high. Root-leaves linear-spathulate, in a rosette. Stem-leaves oblong-linear, narrowing at the base, obtuse, numerous; root-leaves spathulate. Flowers numerous, corymbose, flowering branches sometimes elongated. Segments of the corolla linear-subulate, as long as the tube of the corolla. Lobes of the corolla ovate-lanceolate, pointed (ovate obtuse?). Sandy sea-shores. Annual. June—September.

A. 12, C. 30. Lat. 50°—61°. Alt. 0. T. 52°—45°.

IV. *Gentiana*, Linn. Gentian. Smooth, very bitter, herbaceous plants, with opposite, undivided, entire leaves. Flowers panicled, whorled or solitary. Calyx in five, sometimes in four long acute segments. Corolla tubular, with a more or less spreading limb, and as many segments as there are in the calyx. Stamens equal in number to the segments of the corolla, and alternate with them. Anthers oblong, sometimes coherent. Ovary oblong, nearly cylindrical, with short, erect, sometimes combined styles and flat ovate stigmas. Fruit capsular, nearly cylindrical, one-celled and two-valved, with numerous seeds. Generally distinguished by their angular stems, opposite leaves, and frequently by their intensely brilliant blue colour. They vary in size from an inch or so to several feet. The roots, and also every part of them, abound in a bitter substance which is a celebrated tonic.

G. acaulis, Linn. Gentianella. Large-flowered Gentian. E. B. 1594. Stem erect, two-three inches high, with opposite, elliptic, pointed, clasping leaves. Calyx prismatic, with prominent, keeled midribs; teeth equal, triangular, lanceolate, pointed. Flowers large, deep blue, campanulate, with two rows of dots, which have a metallic lustre, about two inches long. Not native. Perennial. June.

Near Haverfordwest, South Wales. A very doubtful native. "Mons. de St. Amans," "Eng. Fl.," vol. ii., p. 28.

1. *G. verna*, Linn. Spring Gentian. E. B. 493, L. C. 718. Roots slender, creeping, crowned by a tuft of leaves. Stems very short, simple, leafy, bearing a solitary flower. Leaves ovate acute, about half an inch long, Calyx angular, with sharp teeth. Tube of corolla

whitish, limb horizontal, large, vivid blue. Teesdale. Perennial. April.

2. **G. nivalis**, Linn. Small Alpine Gentian. E. B. 896, L. C. 720. Stem erect, *branched*, leafy. Leaves ovate, pointed, lower ones broadly elliptical. Flowers *two or more*, bright blue, solitary and terminal. Calyx cylindrical, angular, with equal acuminate segments. Corolla five-cleft, with intermediate cleft or heart-shaped segments, a greenish tube, and bright blue limb. Near the summits of alpine mountains. Ben Lawers. Perennial. July.

A. 1, C. 2. Lat. 56° — 57° . Alt. 850—1300 yards. T. 38° — 35° .

3. **G. campestris**, Linn. Field Gentian. E. B. 237. Stems erect, angular, leafy, branching from the base, winged. Leaves ovate-lanceolate, clasping, rounder and broader at the base than in *G. amarella*, and tapering more abruptly. Segments of the calyx four, sometimes three or two, *two much larger than the others*, which they partly cover. Segments of the corolla four, abruptly pointed. On dry limestone hills. Annual. August, September.

There is a white-flowered variety not uncommon in Scotland.

A. 18, C. 70. Lat. 50° — 61° . Alt. 0—850 yards. T. 52° — 39° .

4. **G. Amarella**, Linn. Autumnal Gentian. E. B. 236, L. C. 721. Stems erect, branching at the base, angular, with prominent angles, smooth. Leaves ovate-lanceolate, sessile, cordate at the base, glabrous. Flowers numerous, paniced, erect; peduncles variable in length. Calyx three-four-five-cleft, *segments lanceolate*, acute. Corolla *five-cleft*, with sharp segments. Capsule cylindrical, tapering at the apex. Seeds numerous, globular, shining. Calcareous and cretaceous pastures. Annual. July, August.

A. 17, C. 60. Lat. 50° — 61° . Alt. 0—200 yards. T. 52° — 45° .

Var. Stems simple, two-four inches high. Stem-leaves ovate-lanceolate, acuminate. Segments of the calyx four, acuminate, strongly ribbed, with reflexed margins, about two-thirds of the length of the tube. Lobes of the corolla four, shorter and rather obtuser than in the common form; throat fringed with erect hairs, which are half as long as the lobes. Downs, Isle of Wight, near Sconce Point, Yarmouth.

Note.—This appears to be the common form of *G. Amarella* in the western parts of the Isle of Wight. On the Surrey Downs this form is very rare. Dr. Bromfield questioned the distinctness of these two reputed species, and not without reason. *G. Amarella* is the southern, and *G. campestris* the northern, form. "Fl. Vect.," p. 311.—A. I.

5. **G. Pneumonanthe**, Linn. Calathian Violet. E. B. 20, L. C. 719. Roots truncate, of several thick fibres. Stems erect, simple or branched, six-ten inches high, more or less leafy. Leaves lanceolate-linear or linear blunt, the lower ones connate and sheathing. Flowers large, solitary, axillary or terminal, usually contiguous (when not solitary). Divisions of the calyx equal, linear, five-seven. Corolla large, campanulate-funnel-shaped, throat naked, with five short triangular lobes, five-plaited, of a beautiful azure blue.

Anthers coherent after the escape of the pollen. Turfy, marshy places. Perennial. July—October.

A. 8, C. 15. Lat. 50°—55°. Alt. 0—200 yards. T. 50°—47°.

V. **Cicendia**, Adans. *Gentianella*. Least Gentian. Intensely bitter herbaceous plants, with opposite branches. Leaves simple, entire, smooth, opposite. Flowers terminal. Calyx four-cleft, with acute segments. Corolla tubular, with a four-parted limb, and equal spreading segments. Stamens four, erect, with roundish-oblong anthers. Ovary ovate, with a somewhat inclining style, and capitate, undivided stigma. Fruit covered by the enlarged tube of the corolla, two-valved, with inflexed edges and imperfectly two-celled. Seeds numerous, small, rough, attached to a double receptacle (placenta).

Note.—"Edges of the valves not inflexed."—Babington. "Capsule two-valved, with inflexed edges."—Smith. "Capsule * * * biloculaire par l'inflexion des bords des valves."—Coss and Ger.

1. **C. filiformis**, Reich. Least *Gentianella*. E. B. 235, L. C. 723. Stem erect, branching, sometimes trichotomously (three branches from one and the same point of the axis), or simple by abortion, slender, two-six inches high. Root-leaves linear-lanceolate (oblong?); stem-leaves opposite, short, linear. Flowers solitary, on long slender pedicels. Calyx four-cleft, with short triangular lobes. Corolla yellow. South of England. Tilgate Forest, Sussex. Annual. July, August.

A. 2, C. 5. Lat. 50°—52°. Alt. 0—50 yards. T. 52°—49°.

2. **C. Candolii**, Griesb. De Candolle's *Gentianella*. D. C. I. Gal., t. 16. Stem slender, branching from the base, one-four inches high. Leaves *linear-lanceolate*. Calyx *four-parted*, with linear appressed segments. Paradis, Guernsey.—Mr. Babington.

VI. **Chlora**, Linn. Yellow-wort. Smooth, glaucous, annual plants, with opposite or connate leaves. Flowers terminal, stalked, either aggregate or solitary. Calyx in six-eight, deep, linear segments. Corolla with a short tube and a deeply eight- rarely six-cleft cup-shaped limb. Stamens six-eight, with linear erect anthers. Ovary ovate-oblong, with an erect style, and two oblong cleft stigmas. Fruit capsular, furrowed, one-celled, two-valved, with inflexed margins, bearing numerous seeds. This genus is easily distinguished by the eight segments of the perianth. Its fruit and properties are similar to those of *Gentiana*.

C. perfoliata, Linn. Perfoliate Yellow-wort. E. B. 60, L. C. 725. Stems erect, stout, round, smooth, simple, branching above. Root-leaves obovate, narrowed at the base; stem-leaves ovate, angular, united at the base by their whole breadth. Whole herbage glaucous. Flowers deep yellow, handsome, in forked panicles. Fruit oblong-roundish, covered with the scarious persistent tube of the corolla, and terminated by the style. Seeds very small, tubercled. Chalky hills. Annual. July.

A. 10, C. 40. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—48°.

SWERTIA perennis, Linn., is said to have been found in Wales.

"Habitat in Wallia, D. Richardson invenit." Hudson, "Fl. Anglica," 1762.

"Some mistake is to be suspected."—Smith.

The learned author of the "Cybele" deems it "not very improbable that luxuriant examples of *Gentiana Pneumonanthe* might have been thus misnamed."

ORDER LXVI.—**APOCYNACEÆ**, Juss. THE PERIWINKLE FAMILY.

Trees or shrubs. The British species are only two, with trailing stems, and evergreen entire and opposite leaves. Flowers somewhat corymbose. Calyx in five divisions. Corolla deciduous, with five lobes and twisted æstivation (prefloration). Stamens equal in number to, and alternate with, the lobes of the corolla. Ovaries two- or one-two-celled, polyspermous (many-seeded). Fruit of the British species follicular. The British species are easily known by their trailing habit, their bright leathery leaves, and handsome blue flowers. They are chiefly found in tropical regions.



Fig. 162.—*Vinca minor*. 1, Entire plant, very much reduced; 2, entire flower, natural size; 3, section of the ovary.

tube enlarged and angular above, crowned with a membranous ring. Stamens five, inserted about the middle of the tube, just below its enlargement. Anthers longer than their filaments. Style simple, swelling above, and surrounded by a stigmatiferous ring. Fruit either two cylindrical follicles, with inflexed margins, or one only by abortion. Seeds peltate.

1. *V. minor*, Linn. Lesser Periwinkle. E. B. 917, L. C. 716. Stems prostrate, rooting, long, glabrous; the flowering shoots only are erect and short. Leaves ovate or ovate-lanceolate, usually slightly

Vinca, Linn. Periwinkle. Under-shrubs, with creeping rhizomes. Leaves opposite, entire, evergreen. Flowers axillary, solitary, alternate, blue, rarely white or pink. Calyx five-cleft. Corolla salver-shaped, five-lobed; lobes wedge-shaped;

cordate at the base, *glabrous*, on a short glandulous petiole. Pedicels longer. *Divisions of the calyx lanceolate, much shorter than the tube of the corolla.* Shrub. In woods, and other moist shady places. Flowers, March—June.

A. 7, C. 20. Lat. 50° — 53° (58° ?). Alt. 0—200 yards. T. 51° — 48° .

2. **V. major**, Linn. Greater Periwinkle. E. B. 514, L. C. 717. Stems spreading, prostrate, and rooting, the flower-stems only erect, *glabrous*, or almost so. Leaves stalked, ovate, slightly cordate at the base, *downy, ciliated.* Pedicels shorter than the leaves. Flowers large, purplish-blue. Divisions of the calyx linear-lanceolate, *ciliate, about as long as the tube of the corolla.* Corolla funnel-shaped, with horizontally-spreading limb. Segments obovate, connected at their base by a whitish web-like crown. River-sides. Banks of hedges. Naturalized(?). Perennial. April, May.

ORDER LXVII. — **OLEACEÆ**, Hoff. and Link. THE OLIVE FAMILY.

Trees or shrubs, usually with dichotomous branches, which end abruptly in a conspicuous bud. Leaves opposite, simple, sometimes pinnated. Flowers in axillary or terminal racemes or panicles. Calyx divided. Corolla four-cleft, sometimes tetrapetalous, or wanting. Stamens two, alternate with the segments or petals of the corolla. Ovary simple, two-celled, with two-seeded cells. Fruit variable; either a berry, or a capsule, or a samara, two-celled, or one-celled by abortion, two-seeded, or one-seeded by abortion. Seed suspended, often compressed. Embryo straight, in thick, fleshy albumen. Radicle towards the hilum.



Fig. 162.—*Vinca minor*. 3, Section of flower, showing the pistil and stamens; 4, stamen; 6, ovary; 7, pistil.

SYNOPSIS OF THE GENERA.

Fraxinus. Usually lofty trees, with compound leaves, and pendulous samaroid fruit.

Ligustrum. Usually small shrubs, with simple leaves, and baccate fruit.

I. **Fraxinus**, Tournf. Ash. Trees with opposite branches, compressed at the apex. Leaves compound, opposite, smooth. Flowers lateral and terminal. Calyx and corolla separated into four deep linear segments (in the British species absent). Stamens two, with large

four-furrowed anthers. Ovary ovate, two-celled, with short style and cleft stigma. Fruit a lanceolate, flat, pendulous samara, often but one-celled, with a single lanceolate compressed seed. The lofty growth, opposite pinnate leaves, black buds, and naked flowers, with pendant clusters of fruit, distinguish this genus.

F. excelsior, Linn. Common Ash. E. B. 1692, L. C. 715. A lofty, handsome tree. Young branches brittle, green, shining, compressed, with prominent scars (where the leaves have fallen off). Leaves unequally pinnate; leaflets lanceolate, or oblong-lanceolate, acuminate, on short petioles, attenuated below, toothed. Flowers in terminal clusters, on capillary peduncles. Fruit pendulous, oblong, attenuated at the base, compressed and leaf-like in the upper part; crowned by the persistent base of the style. In woods, parks, hedges. Flowers in May. Fruits in July.

A. 17, C. 75. Lat. 50° — 58° . Alt. 0—350 yards. T. 52° — 45° .

Var. *β. heterophylla* (*heterophyllus*). Hook. E. B. 2476. "Fraxinus in sylvis pulcherrima, pinus in hortis."—Virg. Leaves both pinnate and simple.

II. Ligustrum, Tournf. Privet. Shrubs with round, opposite branches, and simple, entire, opposite leaves. Flowers white, in terminal panicles. Calyx tubular, four-cleft. Corolla funnel-shaped, with a four-cleft limb, and spreading segments, with valvular prefloration. Stamens two, alternate, inserted in the top of the tube. Ovary ovate, with a short style, and thick cleft stigma. Fruit a two-celled berry, with two seeds in each cell. The shrubby habit, narrow, opposite leaves, white flower, and black berries distinguish this genus.

L. vulgare, Linn. Common Privet. E. B. 764. Upright small shrubs or trees, usually branching from the base. Branches slender, flexible, usually opposite. Leaves oblong or oblong-lanceolate, glabrous or slightly downy, often shining, slightly leathery, nearly evergreen, on short petioles. Flowers in dense panicles at the end of the branches, on short pedicels, with linear bracts. Berries black when ripe, about the size of a large pea, often enduring to the following spring. Hedges, woods, commons, rocks. Perennial. July.

A. 10, C. 40. Lat. 50° — 55° . Alt. 0—150 yards. T. 52° — 47° .

ORDER LXVIII.—**AQUIFOLIACEÆ**, D. C. THE HOLLY FAMILY.

Trees or shrubs, with evergreen coriaceous leaves, and small axillary, fascicled, or solitary flowers. Calyx polysepalous, consisting of from four to six pieces, with imbricated æstivation. Corolla four- or five-parted, also imbricated in æstivation. Stamens equal to, and alternate with, the segments of the corolla. Ovary fleshy, two-six-celled, with solitary pendulous ovules. Stigma lobed. Fruit fleshy. Embryo minute in the upper part of the seed (nucule). The sole British species is known by its arboreous habit, evergreen,

leathery, lobed leaves, and baccate fruit. Holly-berries, are emetic and purgative; and from a South American species (*Ilex paragu-*



Fig. 163.—*Ilex Aquifolium*. 1, Sprig of Holly in fruit; 2, flower; 3, a stamen; 4, pistil, with lobed stigma; 5, fruit; 6, section, showing the four nucules of which the fruit consists; 7, a single nucule magnified; 8, a section of the same, showing the position of the embryo.

yensis) a tea is prepared which is extensively used in that country. The leaves of this plant afford the bitter principle, Theine, which exists in tea and coffee. Species of Holly are found in Europe, Africa, and America.

Ilex, Linn. Holly. Trees or shrubs, with prickly-edged leaves and axillary or terminal flowers. Calyx monosepalous, with four teeth. Corolla monopetalous, rotate, in four, sometimes five, elliptical segments, or composed of four petals, coherent at the base. Stamens four, shorter than the corolla, with awl-shaped filaments and small two-lobed anthers. Ovary roundish, with four sessile permanent stigmas. Fruit baccate, globular, four-celled, with a solitary seed in each. The upright growth, prickly, leathery, evergreen leaves, axillary pink flowers, and bright red berries, distinguish this handsome tree, the only British example of the genus. The bark abounds in mucilage, which, by maceration in water, may be extracted and converted into bird-lime.

I. Aquifolium, Linn. Common Holly. E. B. 496, L. C. 713. Tree more or less branching. Branches green and shining. Leaves leathery, permanent, ovate or oblong, strongly undulate, with teeth which terminate in strong spines. Flowers in axillary clusters. Fruit of a beautiful red colour, persistent. Hedges, &c. Tree. Flowers, May, June. Fruit, October.

A. 18, C. 80. Lat. 50°—59°. Alt. 0—500 yards. T. 52°—43°.

ORDER LXIX.—**ERICACEÆ**, Juss. THE HEATH FAMILY.

Large or small shrubs, or under-shrubs, with entire, rigid, evergreen, whorled or opposite leaves. Calyx and corolla four-five-cleft, the former sometimes separable into as many pieces. Stamens equal in number to the lobes of the corolla, or twice as many. Ovary

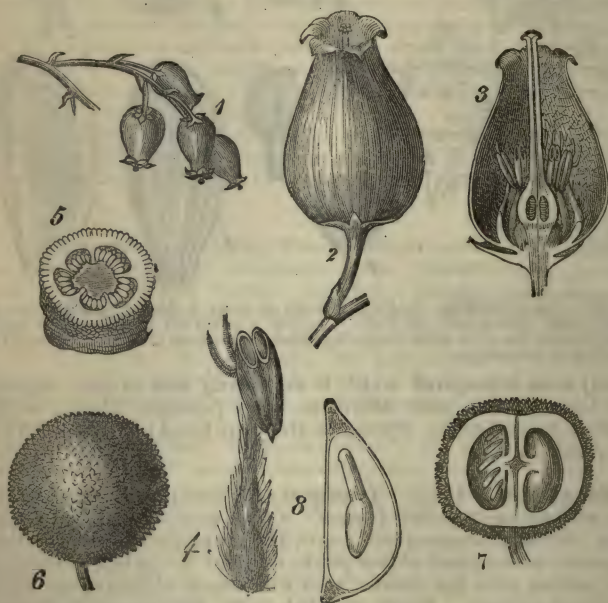


Fig. 164.—*Arbutus Unedo*. 1, A cluster of flowers, natural size; 2, flower magnified; 3, section of the same, showing the stamens and pistil; 4, stamen much enlarged; 5, transverse section of the ovary; 6, the fleshy fruit; 7, section of the same, showing the ovules; 8, section of seed.

many-celled, with many ovules. Fruit capsular, with central placentas. In this country vast tracts are covered by these well-known plants. They are most abundant at the Cape of Good Hope, and decrease as they approach the tropics. In America the order is represented by the splendid *Rhododendrons*, *Azaleas*, *Kalmias*, &c.

TRIBE I.—**Ericææ**. Small trees, with very small whorled leaves. Flowers in panicles or clusters, rarely in simple umbels. Sepals free or united. Corolla campanulate. Fruit dry, capsular.

Genera.—*Erica*, *Calluna*, *Phyllodoce*, *Dabæcia*, *Azalea*, *Andromeda*.

SYNOPSIS OF THE GENERA.

Erica. Calyx four-parted. Corolla campanulate or ovate, four-toothed.

Calluna. Calyx as in *Erica*. Corolla campanulate, four-cleft.

Phyllodoce. Calyx five-parted. Corolla ovate, with a contracted mouth and five teeth.

Dabæcia. Calyx four-cleft. Corolla ovate, inflated with a four-toothed limb.

Azalea. Calyx five-parted. Corolla campanulate, five-cleft.

Andromeda, which has a five-valved, five-celled, dry capsule, unites the two tribes of *Ericaceæ*.

I. **Erica**, Linn. Heath. Small trees or shrubs, with evergreen opposite or whorled, mostly linear, leaves. Flowers in clusters, axillary, or terminal, sometimes unilateral. Calyx composed of four sepals, free or united, permanent. Corolla elongated, ovate or campanulate, four-cleft, withering. Stamens eight, arising from the receptacle, with terminal, erect, cloven anthers, which open by lateral pores. Ovary roundish four-furrowed, four-celled, and four-valved, each valve bearing a partition (dissepiment). Fruit capsular, opening by cells. Seeds numerous, minute. The rigid, round, wiry stems, minute, linear leaves, and clusters of handsome flowers distinguish this genus.

1. **E. cinerea**, Linn. Fine-leaved Heath. E.B. 1015, L.C. 692. Stems downy or glabrous. Leaves whorled in threes, linear, acicular, channelled below, blunt, slightly ciliated. Flowers purple, in short, compact, terminal clusters, on axillary peduncles, bearing one-three flowers. Calyx glabrous. Divisions lanceolate, pointed, about half as long as the corolla, and twice as long as the bracts (calycule). Corolla ovate, urceolate. Stamens included. Anthers with an appendage. Woods and dry elevated places. Perennial. July.

A. 18, C. 82. Lat. 50°–61°. Alt. 0–750 yards. T. 52°–39°.

2. **E. Tetralix**, Linn. Cross-leaved Heath. E. B. 1014, L. C. 690. Stems branching, young shoots hairy or downy. Leaves whorled, three-four in each whorl, oblong-linear, reflexed at the margin, fringed with glandular hairs. Flowers rosy, rarely white, in short, terminal, compact clusters. Sepals ciliated, with very long glandular hairs. Corolla ovate. Stamens included. Anthers with long, pendant, linear, pointed appendages. Moist turfy places. Shrub. July.

A. 18, C. 82. Lat. 50°–61°. Alt. 0–800 yards. T. 52°–39°.

3. **E. mackaiana**, Bab. Mackay's Heath. E. B. 2900, L. C. 690 b. Stem much branched, very leafy. Leaves four, in a whorl, ovate, ciliated, and glandular, whitish below except on the midrib, more or less deflexed or curved, with nearly erect tips. Flowers in terminal clusters on short pedicels. Calyx ciliated, glandular. Corolla ovate-urceolate. Stamens included. Anthers with appendages. Style protruded. West of Ireland, Cunnamara. Shrub. July. Hibernian.

4. **E. ciliaris**, Linn. Fringed-leaved Heath. E. B. 2618, L. C. 691. Stems erect or ascending, long, *with spreading, leafy, hairy branches*. Leaves three-four in a whorl, fringed with long hairs (ciliated). Flowers purple, axillary, on short, one-flowered peduncles, *in more or less elongated clusters*, terminating the stem or branches. Sepals ciliated, glandular. Corolla tubular, urceolate, unequally inflated, slightly curved. Stamens included. Anthers without appendages. Heath. South of England; Wareham, Dorsetshire; Carclew, Cornwall. Shrub. July.

A. 2, C. 2. Lat. 50° — 51° . Alt. 0—50 yards. T. 52° — 51° .

5. **E. mediterranea**, Linn. (?) Mediterranean Heath. E. B. 2774, L. C. 693. Stems brittle, erect, with *numerous erect flowering branches*, two-four feet high. Leaves linear, flat above, furrowed beneath, in fours. Flowers axillary, *solitary*, stalked, intermixed with leaves. Calyx coloured, with lanceolate sepals, about half as long as the urceolate-ovate-cylindrical corolla. Stamens and style exserted, the latter considerably longer than the former. Mountain bogs, Ireland. Shrub. April, May.

Var. β . Stems tall, erect, with numerous erect, leafy branches. Leaves four in a whorl, spreading horizontally, glabrous, flat above and convex beneath. Flowers numerous, drooping. Calyx coloured. Corolla narrow, urceolate; anthers awnless. Both they and the style longer than the corolla (exserted). Ireland.

6. **E. vagans**, Linn. Cornish Heath. E. B. 3, L. C. 694. Stems round, erect, with glabrous nearly erect branches. Leaves whorled, four-five in a whorl, erect, linear-acicular, reflexed, glabrous. Flowers rosy, axillary, on long pedicels, in dense elongated clusters. Sepals glabrous, scarious, short. Corolla short, campanulate-angular. Stamens protruding; anthers without appendages. Style projecting, oblique, or recurved. Cornwall. Ireland. Shrub. July.

A. 1, C. 1. Lat. 50° — 51° . Alt. 0—50 yards. T. 52° — 51° .

II. **Calluna**, Salisb. Ling. Shrubs with round, hard, branching stems, generally of humble growth. Leaves minute, imbricated in rows, evergreen. Flowers in drooping racemes. Calyx coloured, consisting of four sepals, within *a four-leaved fringed involucre*. Corolla monopetalous, campanulate, four-cleft, shorter than the calyx. Stamens eight, short, curved, with terminal, erect, acute anthers. Ovary orbicular, furrowed, with a cylindrical, nearly erect style, and capitate stigma. Fruit capsular, four-celled and four-valved, with numerous seeds. The essential difference between this genus and *Erica* consists in the fruit. In *Calluna* the dissepiments are unconnected with the valves, in *Erica* the partitions spring from the centre of the valves. The four green bracts (involucre) and the imbricated leaves obviously distinguish this genus from *Erica*.

C. vulgaris, Salisb. Common Ling. E. B. 1013, L. C. 695. Young shoots glabrous or downy, with numerous sterile branchlets. Leaves opposite, closely imbricated in four rows, lanceolate linear, very short, thick, channelled and hooded above, and convex or keeled

below, prolonged at the base (two-spurred), glabrous or downy, finely fringed at the apparent margin (the true margin is reflexed). Flowers axillary, in clusters or spiked panicles. Calyx scarious, coloured. Corolla very small, concealed by the calyx. Stamens included. Anthers with appendages. Dry, upland, peaty places. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1100 yards. T. 52°—36°.

III. Phyllodoce, Don. Flowers aggregate. Calyx deeply parted; segments five, hairy, acute. Corolla longer than the calyx, ovate, five-cleft, with a contracted mouth. Stamens usually ten. Fruit capsular, elliptic, four-five-valved, and with as many cells as valves. Seeds numerous, attached to a central column.

P. cœrulea, Salisb. *Menziesia cœrulea*, Sm. E. B. 2469, L. C. 696. Stems long, decumbent, the leafy flowering recent part only erect, and a few inches high. Leaves ovate-elongate, furrowed above and smooth, downy below, with revolute margins, numerous, petioled opposite; base of the petiole clasping. Scotland and the Scottish isles. Shrub. Flowers, June, July.

A. 1, C. 1. Lat. 56°—57°. Alt. 0—900 yards. T. 38°. ¹

IV. Dabœcia, Don. (?) Calyx and corolla four-parted. Stamens eight; capsule four-celled.

D. polifolia, Don. *Menziesia*, Sm. St. Dabeoc's Heath. E. B. 35, L. C. 697. Stems bushy, erect, afterwards decumbent, round, tapering, hairy, leafy. Leaves elliptical, with revolute margins, white and cottony below, shining above. Flowers large, purple, in long, lax clusters, on hairy reflexed pedicels. Divisions of the calyx lanceolate, hairy, ciliated. Lobes of the corolla reflexed, short, crenulate. Stamens round, shorter than the anthers. Anthers prolonged at the base, with diverging lobes. Ireland. Shrub. July.

A. 5. Hibernian.

V. Azalea, Linn. Azalea. Calyx five-parted. Corolla campanulate. Stamens five. Fruit capsular, two-three-valved, two-three-celled. Seeds attached to a central column.

A. procumbens, Linn. Trailing Azalea. E. B. 865, L. C. 698. Stems ligneous and tortuous, with very leafy branches. Leaves small, elliptical, with revolute margins. Calyx purple, deeply five-parted. Corolla nearly bell-shaped, with spreading obtuse segments. Scottish mountains. Shrub. May, June.

A. 4, C. 12. Lat. 56°—61°. Alt. 500—1200 yards. T. 42°—35°.

VI. Andromeda, Linn. Wild Rosemary. Shrubs, with simple, mostly evergreen, leaves. Flowers solitary or aggregate. Calyx coloured, with five deep, acute segments. Corolla monopetalous, ovate or campanulate, with a five-cleft limb, and five small reflexed segments. Stamens ten, shorter than the corolla. Anthers incumbent, opening by two terminal pores, furnished with two reflexed awns. Ovary roundish, five-furrowed, with a long persistent style

and obtuse stigma. Fruit capsular, five-angled, five-celled, five-valved, each valve bearing a central partition. Seeds numerous.

A. polifolia, Linn. *Andromeda*. E. B. 713, L. C. 699. Root more or less creeping. Stem woody, reclining at the base, erect, round. Leaves elliptic-lanceolate, on short petioles, glaucous or white below, margins strongly revolute, persistent. Flowers terminal, drooping, pink, on peduncles longer than the flowers. Fruit erect. Mountainous parts of England, and Lowlands of Scotland.

A. 13, C. 25. Lat. 51°—57°. Alt. 0—200 yards. T. 49°—46°.

TRIBE II.—**Arbuteæ**. Calyx five-parted. Corolla globose or ovate-campanulate, with a small, contracted, five-cleft, reflexed border. Fruit a many-seeded berry.

Genera.—*Arbutus*, *Arctostaphylos*.

SYNOPSIS OF THE GENERA.

Arbutus. Fruit granular externally.

Arctostaphylos. Fruit not granular.

VII. **Arbutus**, Linn. Strawberry Tree. Bearberry. Trees or trailing shrubs. Leaves simple, alternate, evergreen. Flowers racemose, drooping. Calyx monosepalous, small, in five deep segments. Corolla monopetalous, ovate, with a five-cleft limb, and recurved segments. Stamens ten, slightly attached to the base of the corolla. Anthers incumbent, with terminal pores, and two reflexed horns or awns. Ovary roundish, seated on an orbicular receptacle. Style as long as the corolla, with an obtuse stigma. Fruit baccate, five-celled. Seeds many, angular, long.

A. Unedo, Linn. Strawberry Tree. E. B. 2377. Stem *arborescens*, with rough bark, branching. Leaves oblong, attenuated below, slightly serrated, leathery, glabrous, petioled, evergreen. Clusters terminal, paniced, drooping. Calyx flat, scarcely covering the base of the corolla. Corolla urceolate, pinkish, yellow, with red striæ. Lobes small, broad, reflexed. Fruit red. Killarney, Ireland. Flowers, September, October. Fruit in the following season.

VIII. **Arctostaphylos**, Tourn. This genus differs from *Arbutus*, with which it was formerly united, chiefly in the nature of the fruit, which is only four-five-seeded, or one perfect seed in each cell. There are rudimentary seeds besides.

1. **A. Uva-ursi**, Spr. Bearberry. E. B. 714, L. C. 701. Stems procumbent; young shoots downy, leafy. Leaves oblong or obovate, tapering below, on very short petioles, glabrous and slightly wrinkled above, scaly-pubescent below, with downy margins. Flowers rose-coloured, in short, terminal, drooping clusters. Fruit a roundish scarlet berry. Seeds four-five. Dry, stony, alpine heaths. North of England and Scotland. Small shrub. June, July.

A. 8, C. 20. Lat. 54°—61°. Alt. 0—950 yards. T. 47°—37°.

2. **A. alpina**, Spr. Alpine Strawberry. E. B. 2030, L. C. 700. A procumbent shrub, with erect, leafy, flowering shoots. Leaves roundish-ovate, pointed, *wrinkled, serrated*, withering on the stem. Flowers white, slightly hairy, with a minute five-toothed spreading limb. Fruit round, green, then red, and when ripe, in the following spring, black, one-seeded. Seed elongate, very hard. In mountainous heathy parts of Scotland. Shrub. May, June.

A. 4, C. 7. Lat. 56°—61°. Alt. 0—900 yards. T. 46°—36°.

†† Ovary more or less united with the calyx.

The orders in this section are connected by the general characters of—1st, ovary inferior; 2nd, corolla monopetalous and generally by the one- or few-seeded fruit. The orders with polyspermous ovaries are—*Campanulaceæ*; sub-order, *Lobeliæ* and *Cucurbitaceæ*. The calyx is also generally present only in a rudimentary state, and is mostly persistent. *Vacciniaceæ* unite the preceding with the subsequent orders, and are known by their shrubby habit, small size, and urceolate corollas; *Campanulaceæ* by their herbaceous habit, by their conspicuous showy flowers, and by their many-seeded capsules; *Compositæ*, the largest family in the vegetable kingdom, are known by their common, flat, or raised receptacle, which is sometimes chaffy, sometimes plain (flat), and sometimes pitted, also by their cohering anthers; *Dipsaceæ* by the capitate inflorescence and leafy involucre, the Valerian family (*Valerianaceæ*), by its herbaceous, upright habit, one-celled ovary, with a single ovule; *Rubiaceæ* (*Stellatæ*), by its square stem and whorled leaves; *Caprifoliaceæ*, by its opposite leaves, its dry or succulent fruit with few seeds, and by its woody stems. The gourd family (*Cucurbitaceæ*) is distinguished by its succulent many-seeded fruit, and climbing habit.

ORDER LXX.—**VACCINIACEÆ**, D. C. THE BILBERRY, OR CRANBERRY FAMILY.

Shrubs, with coriaceous, alternate leaves. Calyx entire, or four-six-lobed. Corolla four-six-lobed. Stamens twice as many as the lobes of the corolla, with an epigynous, discoid insertion. Ovary four- or five-celled, with one or many seeds. Style and stigma simple. Fruit baccate, crowned by the persistent limb of the calyx. These plants are all distinguishable by their shrubby habit, leathery leaves, and their baccate fruit. The berries of several are eatable, viz., *Cranberry*, *Bilberry*, *Whortleberry*, &c. They abound in America, where they extend to high northern latitudes. They are not uncommon on high land in the Sandwich Islands; but they are more sparingly distributed in Europe.

Vaccinium, Linn. Bilberry. Black Whortleberry. Mostly small shrubs, with simple, alternate leaves. Flowers aggregate or solitary. Calyx monosepalous, four-five-toothed or cleft. Corolla campanulate, with four revolute segments. Stamens eight-ten, with

flattened filaments, inserted on the receptacle. Anthers terminal, erect, emitting the pollen by terminal pores. Ovary roundish, with



Fig. 165.—Flower and fruit of *Vaccinium*. 1, Entire flower inverted, natural size; 2, section of the same, magnified; 3, stamen, magnified; 4, fruit; 5, transverse section of fruit, magnified; 6, seed, magnified; 7, section of same, showing the embryo.

a simple, erect style, and obtuse stigma. Fruit baccate, globular, four-five-celled, with a central depression, and a few small angular seeds. The British species are distinguished by their small, simple, leathery, alternate leaves, by their acid, eatable berries, and by their habitats, turfy bogs, mountainous heaths, and woods.

1. *V. Myrtillus*, Linn. Bilberry-bush. E. B. 456, L. C. 703. Stems erect, branching. Branches erect, leafy, angular; angle prominent; bark smooth, shining. Leaves ovate, leathery, serrated, deciduous, pale green. Flowers solitary, axillary, on short reflexed peduncles, pale green, or red. Corolla urceolate. Anthers with hair-like appendages. Fruit black, covered with a glaucous bloom (efflorescence), slightly acid. On elevated heathy and stony places. Shrub. June—August.

A. 18, C. 75. Lat. 50° — 61° . Alt. 0—1400 yards. T. 51° — 33° .

2. *V. uliginosum*, Linn. Bog Whortleberry. E. B. 581, L. C. 704. Stems more or less prostrate, with erect, leafy, short branches. Leaves shortly petioled, obovate or elliptical, entire, flat, obtuse, sometimes with a slight point, with prominent nerves, rather leathery, deciduous. Flowers clustered. Corollas four-cleft, pinky, drooping. Stamens eight. Fruit large, bluish-black. Seeds finely striated. Mountainous parts. North of England and Scotland. Shrub. May, June.

A. 6, C. 15. Lat. 54° (53°)— 61° . Alt. 200—1100 yards. T. 45° — 35° .

3. *V. Vitis-Idæa*, Linn. Cowberry. Red Whortleberry. E. B. 598, L. C. 705. Stem woody, diffuse, branching, round; young shoots hairy and leafy. Leaves obovate, dotted and glaucous below, smooth

and shining above, margin slightly revolute, petioled, evergreen. Flowers rosy white, clustered, with concave, coloured, ciliated bracts, Calyx segments broad, short, blunt, reddish. Corolla campanulate, with four reflexed lobes. Fruit succulent, red. Mountain heaths. Perennial. July.

A. 14, C. 50. Lat. 51°—59°. Alt. 100—1100 yards. T. 47°—35°.

4. **V. Oxycoccus**, Linn. Cranberry. E. B. 319, L. C. 706. Stems *filiform*. woody, red, shining, leafy, *prostrate*, *rooting*, and branching. Leaves ovate, entire, on short petioles, shining above, hoary below, with revolute margins. Flowers solitary, red, on long filiform peduncles, which are much longer than the leaves, one-three at the top of the stems or branches. Lobes of the corolla lanceolate, blunt, reflexed. Fruit red, of an agreeable acid taste. On wet, elevated moors, among *Sphagnum* and other moor plants. Flowers, June. Fruit, August.

A. 17, C. 50. Lat. 50°—58°. Alt. 0—800 yards. T. 50°—38°.

ORDER LXXI.—CAMPA- NULACEÆ, Juss. THE CAM- PANULATE FAMILY.

Herbs or under shrubs. Leaves exstipulate, mostly alternate. Flowers in panicles, clusters, heads, spikes. Calyx five-lobed, occasionally three-eight-lobed, persistent. Corolla inserted into the top of the calyx, with an equal number of lobes withering on the fruit. Stamens inserted into the calyx, equal in number to the lobes of the corolla. Ovary adherent, with two or more many-seeded cells. Style single, covered with collecting hairs. Stigmas two-three, rarely five, linear-revolute, rarely two and erect. Fruit opening by apertures in the sides, or by valves at the apex, crowned by the permanent calyx. Seeds numerous, horizontal, very small. Embryo straight, in fleshy albumen. Radicle towards the hilum. The British species are herbaceous, generally milky, mostly with blue or white flowers, and may be known from the other orders of this section by their polyspermous capsular fruit, and by their regular corolla. They are plentiful in the northern regions of Europe, Asia, and America, but are scarcely known in the

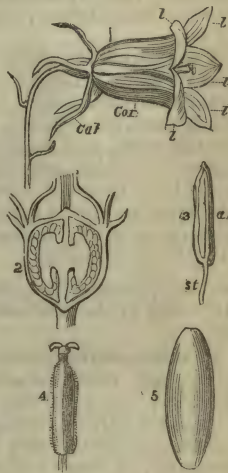


Fig. 166.—*Campanula rotundifolia*. 1, Flower entire; *cal*, calyx; *cor*, corolla; *l*, *l*, *l*, *l*, *l*, lobes of ditto. 2, Longitudinal section of the ovary, magnified. 3, Stamen and anther; *st*, stamen; *a*, anther. 4, Style and stigma. 5, Seed. All magnified except 1.

tropical regions. De Candolle remarks that "the chain of the Alps, Italy, Greece, Caucasus, and the Altai range are their true country;" also that "the species rapidly decrease in all directions distant from these limits" (centres?). The same celebrated botanist further states that South Africa is another station, but that none of the genera peculiar to the north are found there.

TRIBE I.—**Campanuleæ.** Flowers regular, blue or white.

Genera. — *Campanula*, *Wahlenbergia*, *Specularia*, *Phyteuma*, *Jasione*.

SYNOPSIS OF THE GENERA.

Campanula. Calyx-tube short. Corolla bell-shaped. Fruit capsular, inferior, opening by lateral pores.

Wahlenbergia. Calyx and corolla as in *Campanula*. Fruit half-superior, opening by valves.

Specularia. Calyx-tube linear-oblong. Corolla rotate.

Phyteuma. Corolla tubular, with linear divisions. Stigmas revolute.

Jasione. Corolla tubular, with linear divisions. Stigmas erect.

I. ***Campanula***, Linn. Bell-flower. Herbs, rarely shrubs, with milky juice. Leaves alternate, usually simple. Flowers in clusters, cymes, or heads. Calyx five-parted, with acute, generally spreading segments. Corolla bell-shaped, with a regular limb of five shallow segments, and furnished at the base with five acute converging valves, which cover the ovary. Stamens with dilated filaments and long, linear, compressed anthers. Ovary angular, with a thread-shaped, downy or hairy style. Stigma two-three cleft. Fruit capsular, three- rarely five-celled, bursting laterally, rarely at the summit. Seeds numerous.

SECT. I.—Flowers on peduncles, never in compact heads.

§ 1. Calyx of the fruit erect. Capsule opening by valves near the summit.

1. ***C. Rapunculus***, Linn. Rampion Bell-flower. E. B. 283, L. C. 677. Root fleshy, tapering, milky, white. Stem erect, tapering, furrowed, hairy below, smooth, simple, or branching above, leafy. Leaves narrow, *oblong, tapering* below (oblanceolate), upper ones lanceolate, slightly hairy on both sides, bluntly toothed or entire. Flowers erect, *in long, lax, compound panicles*, the lower ones on long, the upper on short, stalks. Segments of the calyx linear, setaceous, *more than half as long as the corolla*. Corolla light or pale blue. South of England; on light gravelly soil. Wood between Bexley and Dartford. Mr. J. B. French. Perennial. July, August.

A. 6, C. 12. Lat. 51°—53°. Alt. 0—100 yards. T. 50°—48°.

2. ***C. persicifolia***, Linn. Peach-leaved Bell-flower. E. B. 2773, L. C. 682. Stem glabrous, rounded, usually simple, with distant leaves. Leaves obovate or oblong, tapering into petioles, *slightly serrate*, quite smooth, upper leaves sessile, lanceolate or *linear-lanceolate*. Flowers erect, solitary, terminal. Corolla broadly campanulate, with

broad, pointed, spreading segments. Scotland. Mr. George Don. Common in gardens.

A. 15. Alien. Apparently naturalized in Scotland, as *Hieracium aurantiacum* is.

3. **C. patula**, Linn. Spreading Bell-flower. E. B. 42, L. C. 676. Stems stout, angular or winged, rough, erect, *much branched near the summit*, branches slender, rough. Root-leaves obovate, blunt, slightly crenate, decaying before the flowers appear. Stem-leaves linear-lanceolate, coarsely toothed. Flowers in lax panicles, on long slender peduncles. Segments of the calyx *elongated, with subulate points*. Corollas funnel-shaped, spreading, on long pedicels. Woods and hedges. Fairfield Wood, Clent, Worcestershire, where this species is not uncommon. Biennial. July—September.

A. 9, C. 20. Lat. 50°—55°. Alt. 0—100 yards. T. 51°—48°.

4. **C. Trachelium**, Linn. Nettle-leaved Bell-flower. E. B. 12, L. C. 680. Roots tufted, fleshy or woody, cylindrical. Stems erect, a yard high, simple or branching near the top, rigid, rough, five-angled, angles prominent. Lower leaves rough, cordate at the base, ovate acuminate, with large, unequal teeth, petioled, upper leaves ovate or ovate-lanceolate. Flowers one-three, usually two, on short axillary peduncles, forming a clustered panicle or a cluster. *Calyx hairy, with lanceolate divisions, erect after flowering or slightly spreading*. Corolla twice as long as the calyx, with unequal ciliated lobes. Cretaceous soils; in hedges and shady places. Perennial. July.

Var. *β. urticæfolia*. Stems slender, peduncles one-flowered.

Sub-var. *laciniata*. Leaves lanceolate-acuminate, with long linear-lanceolate teeth (lobes).

5. **C. rapunculoides**, Linn. Rampion-like Bell-flower. E. B. 1369, L. C. 680. Root creeping extensively. Stem erect, simple, slightly angular, rough, with minute, deflexed hairs. Root-leaves on long stalks, *cordate*, elongate (like violet leaves, Sm.) Stem-leaves ovate-acuminate, the upper ones sessile, or nearly so, lanceolate or linear-lanceolate, all unequally toothed or more or less rough and wrinkled. Flowers solitary, or in pairs, pedicelled, upper ones sessile or nearly so, in a spike-like, unilateral cluster. *Calyx rough, with linear-lanceolate divisions, reflexed after flowering*. Corolla with ciliated or hairy lobes, three times as long as the calyx. Woods and fields.

In Cosson and Germain's "Flore des Environs de Paris," it is stated that this plant is found in uncultivated gardens, cultivated fields, vineyards, near dwellings, and spontaneous in the gardens of the Museum. Perennial. July, August.

Under a wall at Long-hedge Farm, Battersea. On the roadside, between Churchill station and Clent; but always near houses, and not plentiful. It is probably naturalized.—A. I.

§ 2. Flowers on peduncles, capsule opening by pores at the base.

6. **C. latifolia**, Linn. Broad-leaved Bell-flower. E. B. 302, L. C. 678. Stems erect, hollow, or filled with pith, *round, tapering, smooth, two yards high*. Lower leaves *ovate-lanceolate, tapering,*

pointed, petioled; upper ones sessile, elliptical, lanceolate, all serrated. Segments of the calyx lanceolate, tapering, pointed, finely serrated. Corolla with strongly revolute lobes and prominent nerves, hairy within. Woods and groves. North of England and Scotland. Perennial. July.

7. **C. rotundifolia**, Linn. Nodding-flowered Hare-bell. E. B. 866, L. C. 675. Roots fleshy, tapering, fibrous. Stems *slender*, reclining at the base, ascending, erect, usually simple, leafy, especially below, smooth. Root-leaves *roundish*, *petioled*. Stem-leaves *linear-lanceolate*, sessile. Flowers in a lax panicle or cluster. Divisions of the calyx linear-subulate. Lobes of the corolla ovate-pointed. Dry banks and commons. Perennial. July.

SECT. II.—Flowers sessile, mostly capitate.

8. **C. glomerata**, Linn. Clustered Bell-flower. E. B. 90. Root oblique. Stems erect, simple, round, downy, four-twelve inches high. Leaves rough, with short, rigid hairs; the lower leaves ovate-oblong, cordate or truncate at the base, the lower *petioled*; the upper ones ovate-lanceolate, sessile; all very finely crenulate. Flowers contiguous in lateral or terminal heads, rarely solitary. Calyx-divisions linear, pointed, hairy, short. Capsule opening by three basal holes. Dry, chalky, grassy places. Perennial. July, August.

I have a specimen from a meadow at Walton-on-Thames, collected by Mr. Salmon, far from the chalk.—A. I.

II. **Wahlenbergia**, Schrad. In stem-leaves and form of flower this agrees with *Campanula*. The capsule is only half inferior, and has a valvular dehiscence.

W. hederacea, Reich. Ivy-leaved Bell-flower. E. B. 73, L. C. 683. Stems slender, filiform, branched, leafy. Leaves roundish, cordate, with angular lobes. Peduncles longer than the leaves, axillary and solitary. Calyx-segments subulate. Flowers pale blue, slightly drooping. Fruit round, erect. South and West of England, Wales, &c. Perennial. June—September.

× III. **Specularia**, Heist. Annuals. Leaves crenulate or waved. Flowers violet, in terminal panicles. Calyx constricted above the ovary, with five lanceolate divisions, narrowed at the base. Corolla rotate, five-lobed. Stamens dilated and membranous at the base. Stigmas three, filiform. Fruit linear-oblong, prismatic, three-celled, opening near the top by three lateral pores.

S. hybrida, D. C. Venus' Looking-glass. E. B. 375, L. C. 684. Stems erect, rigid, angular, with short, rough hairs, branching above or from the base. Leaves ovate-lanceolate, elliptical-lanceolate or linear and spathulate, crisp, sessile. Flowers violet, contiguous at the top of the stem, usually in threes, more or less divergent. Divisions of the calyx oblong or oblong-lanceolate, more or less erect. Lobes of corolla obovate, notched and mucronate, *open* (abortive?). Fruit large, with rounded angles, deep furrows, and short, bristly white hairs. Chalky corn-fields. Chelsea College. Annual. June.

IV. *Phyteuma*, Linn. Rampion. Herbaceous plants. Stems round, with simple, entire or crenate leaves. Flowers spiked or capitate (scattered in oriental species). Calyx in five deeply-divided, acute segments. Corolla rotate, in five deep, linear, acute, recurved segments. Stamens five, dilated at the base with oblong anthers. Ovary angular, with a curved style, and from two to three spreading stigmas. Fruit capsular, two-three-celled, ribbed, bursting laterally and irregularly. Seeds numerous, small, obovate. Distinguished from *Campanula* by the tubular corolla, with a deeply divided limb and narrow segments; and in the British species by the capitate or spicate flowers.

1. ***P. orbiculare*, Linn.** Round-leaved Rampion. E. B. 142, L. C. 685. Root fleshy, tapering, scaly, and with fibres. Stems erect, simple, angular, glabrous. Root-leaves oblong or oblong-lanceolate, crenulate, truncate or attenuate at the base, petioled. Stem-leaves linear-lanceolate, sessile, more or less toothed. Bracts ovate, pointed. Flowers deep blue, in round heads, becoming ovate when at maturity. Chalky pastures. Perennial. June.

2. ***P. spicatum*, Linn.** Spiked-flowered Rampion. E. B. 2598, L. C. 686. Root-leaves and lower stem-leaves ovate-pointed, or ovate-lanceolate, or cordate, crenulate on long petioles. Upper leaves petioled or sessile, lanceolate. Flowers whitish-yellow, rarely blue, in terminal oblong spikes, elongated after flowering, with linear subulate bracts. Sussex. Perennial. June.

V. *Jasione*, Linn. Sheep's-bit. Annual herbs, with simple leaves and capitate inflorescence. Calyx and corolla as in *Phyteuma*. Stamens five, with anthers united at their base. Ovary roundish, with erect style and cloven stigma. Fruit capsular, imperfectly two-celled, opening by a round pore at the apex. This genus is closely related to *Phyteuma*, but may be distinguished by the combined anthers, the terminal orifice, and partitions of the capsule, and more obviously by the many-leaved involucre.

***J. montana*, Linn.** Sheep's Scabious. E. B. 882, L. C. 687. Root vertical, tapering. Stems several or solitary, rough and hairy below, smooth and furrowed above, erect or ascending, simple or branching above. Leaves linear-lanceolate, not pointed, undulate, rough and hairy, especially below. Flowers blue, in dense globular umbels, with an involucre. Bracts of the involucre scarious-membranous, with an herbaceous point, ovate fringed. Divisions of the calyx linear; divisions of the corolla linear-lanceolate. Fruit globular. Dry sandy heaths and commons. Annual or biennial. June, July.

TRIBE II.—*Lobeliææ*, Juss. THE LOBELIA TRIBE. Herbs or shrubs, with alternate exstipulate leaves and terminal or axillary flowers. Calyx entire or five-lobed. Corolla irregular, five-lobed or parted, inserted into the calyx. Stamens five, attached to the calyx. Ovary consisting of from one to three cells, with nume-

rous ovules. Style simple. Fruit capsular, with one or more cells, opening at the apex. Seeds numerous. Distinct from *Campanu-*

laceæ by their irregular corolla, and by the excessive acidity of their milk; also by the intense red of the blossoms in some of the species, a colour never found among the campanulaceous genera. They are found both in temperate and hot climates.



Fig. 167.—1, Flower of a *Lobelia*; 3, united anther, magnified; 5, transverse section of the ovary.

Lobelia, Linn. *Lobelia*.

Herbs or shrubs, with acrid, milky juice, and simple, entire leaves. Flowers racemose or solitary. Calyx five-parted, with nearly equal segments. Corolla with a cylindrical tube, and an irregular five-parted limb, the two upper segments of which are small, and form the upper lip; the others are larger, more diverging, and form the lower lip. Stamens five, as long as

the tube, and cohering by their anthers. Ovary two-three-celled, with a cylindrical style and capitate stigma, with a fringe of hairs. Fruit capsular. The irregular bilabiate corolla, the united anthers, and the acrid juice, together with the fringe of hairs under the stigma, serve to distinguish this sub-order from *Campanuleæ*, with which it is closely connected. The flowers are often bright scarlet, and all are narcotic acrid poisons.

1. **L. Dortmanna**, Linn. Water *Lobelia*. E. B. 140, L. C. 689. Stem erect, round, nearly leafless, submersed, bearing a simple cluster of light blue, drooping, alternate flowers, rising a few inches above the water. Leaves radical, in a dense tuft, *linear, entire*, obtuse, divided by an internal partition into two cells, two or three inches long. Pedicels decreasing in length upwards. Corolla bearded at the mouth. Capsule oblong, five-angled, crowned with the calyx. Lakes in Wales, Scotland, North of England, and Ireland. Perennial. July.



Fig. 167.—2, United stamens; 4, pistil; 6, seed; 7, section of the seed.

2. *L. urens*, Linn. Acid Lobelia. E. B. 953, L. C. 688. Stems erect or ascending, simple, rarely branched above. Root-leaves obovate-oblong, crenulate, or slightly toothed, tapering below, sessile. Flowers in long terminal clusters, on short pedicels, with linear bracts. Calyx-tube elongate, with linear acuminate divisions. Heaths in Devon. Perennial. August, September.

ORDER LXXII.—**COMPOSITÆ**, Adans. THE COMPOSITE FAMILY.

Herbaceous or half-shrubby plants. Leaves alternate (rarely opposite or whorled), simple or compound. Heads of flowers in irregular cymes, or in roundish compact clusters; the terminal heads flower first (general inflorescence definite or centrifugal); sometimes solitary, rarely in panicles (general inflorescence indefinite or centripetal). Florets either perfect (males and females), or the exterior ones (florets of the ray, circumference) neuter or female, the interior ones (florets of the disk, centre), perfect, or only male. The florets are either all tubular (discoid, flosculous), or all ligulate; or of two kinds—those of the centre tubular, those of the circumference ligulate. The florets are either all of the same colour or of two colours; in the latter case the central florets are usually yellow. Florets sessile, on a common receptacle, surrounded by an involucre, the whole forming a head (capitulum). Involucre composed of small, herbaceous, membranous or scarious leaves (leaflets, bracts), which vary in number and position. Receptacle either flat or convex, or conical, or cylindrical, more or less



Fig. 168.—1, Head of a compound (composite) cynarocephalous flower; *a*, the involucre. 2, A single floret, magnified. 3, Head of a compound radiate flower; *a*, involucre. 4, A central floret. 5, A ray floret (floret of the circumference). 6, Stamens; *a*, anthers united; *b*, free filaments; *c*, stigma; *d*, lower portion of style. 7, Head of *Cichorium Intybus*. 8, A ray floret; *a*, the ovary; *b*, the ligulate or strap-shaped corolla; *c*, the stamens.

pitted at the point where the florets are inserted, smooth or hairy, or scaly or chaffy. Calyx united with the ovary, without a limb, reduced to a circular thick or thin, entire, toothed, incised or variously divided rim (elevated border), usually producing what is called the crown, viz., fibrous or silky hairs (pappus, down), which is either soft or smooth, rough, ciliated, or feathery. Corolla inserted on the calyx-tube, either withering or caducous, gamopetalous, tubular, with a regular or irregular limb, usually four-five-toothed or four-five-cleft, valvate before flowering. Stamens four-five, inserted in the tube of the corolla; filaments free, jointed above. Anthers erect, united by their margins, and forming a tube which surrounds the style (synanthère). Style filiform, sometimes with a knot in the upper part, two-cleft. Stigmas linear, with one or two stigmatic lines on the inner face of the cleft portions of the style. Fruit (achenium) dry, one-celled, one-seeded, not opening, with or without a beak (remains of the calyx), with or without a crown of capillary down or scales. Seed erect, usually closely invested by the pericarp. Albumen none. Embryo straight. Radicle towards the hilum.

SUB-ORDER. I.—**TUBULIFLORÆ**, End. Heads composed of tubular florets, regularly four-five-toothed (the central florets always are).

DIVISION I.—**Cynarocephalæ**. Plants often spinous; leaves alternate. Florets tubular, usually deeply five-cleft, all equal; or those of the circumference barren, tubular, funnel-shaped, larger, and radiating. Receptacle often fleshy, furnished with chaffy scales or hairs, or deeply pitted. Style enlarged above, and often hairy at the enlargement, with longer or shorter branches; the stigmatic lines reach the summit. Seeds (fruit) usually with a plume, either free or united at the base.

TRIBE I.—Fruit crowned with long fibres, which are either smooth, or rough, or feathery, united at the base by a ring (rim), caducous, falling off in a single piece.

Genera.—*Onopordum*, *Carlina*, *Carduus*, *Silybum*.

SYNOPSIS OF THE GENERA.

Onopordum. Receptacle alveolate (honeycomb-like). Involucral bracts spinous.

Carlina. Receptacle with cleft scales. Inner involucral bracts coloured and radiating.

Carduus. Receptacle with fringed scales. Down (pappus) long, rough, or feathery.

Silybum. Bracts of the involucre ending in a long, spreading spine. Receptacle hairy (?).

I. **Onopordum**, Linn. Cotton Thistle. Large, annual or biennial, hoary, spinous plants. Stems tall, upright, usually winged.

Leaves lobed, wavy, toothed, spinous. Flowers lateral and terminal, solitary or aggregate, and on radical stalks. Involucre orbicular, tumid. Scales (bracts) spinous-pointed, either spreading or erect. Receptacle convex, fleshy, with deep honeycomb-like pits (cells). Fruit obovate, four-ribbed, smooth, deeply sunk in the substance of the receptacle. Pappus capillary, rough, attached to an annular ring which crowns the fruit.

O. Acanthium, Linn. Cotton Thistle. E. B. 977, L. C. 608. Stem robust, branching, leafy, with broad spinous wings, very cottony or shaggy. Leaves sinuate, pinnatifid, with triangular, short lobes, terminating in strong spines; all cottony or woolly; the root-leaves narrowed at the base; stem-leaves decurrent. Heads globular, cordate at the base; bracts subulate, strongly spinous; the lower bracts reflexed, the middle ones spreading, the upper erect, all cottony and fringed, with minute sharp teeth. Receptacle very fleshy, deeply pitted. Fruit five-angled, oblong, with concave sides, tapering towards the base. Crown of the outer *achenia* on long pedicels, of the inner ones on short pedicels, or sessile on the rim. Not unfrequent in Kent, about Northfleet, Greenhithe, Gravesend, &c. Biennial. July.

A. 14, C. 30 (40). Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

Note.—A variety or a species was collected at Wandsworth steam-boat pier, with the following characters:—Stem not so tall nor robust as in *O. Acanthium*. Leaves green, without the web-like pubescence. The spines of the involucre are longer and more dilated than in the former, and the crest of the carpels is purple at and above the ring. The carpels also differ from those of *O. Acanthium*.

II. Carlina, Linn. Carline Thistle. Rigid, dry, prickly plants. Stems erect, leafy. Leaves prickly. Receptacle chaffy. Involucre tumid. Outer bracts herbaceous, spinous, lax, permanent; the inner long, scaly, polished, spreading horizontally, and forming rays to the flowers. Anthers with two bristles at the base. Stigma simple or divided. Fruit conical, rough. Down partly feathery, partly chaffy.

C. vulgaris, Linn. Common Carline Thistle. E. B. 1144, L. C. 609. Stems erect, branching at the top, six-eighteen inches high, downy, or with long woolly hairs. Leaves oblong-lanceolate, toothed or lobed, with strong spines, woolly or tomentose, especially beneath. Heads roundish. Outer bracts leaf-like, ciliated, with strong spines; inner ones more deeply fringed, with slenderer spines. On dry chalky and sandy places. Biennial. July—September.

Note.—This is a hygroscopic plant. Its involucre expands only when surrounded by a dry atmosphere.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—250 yards. T. 52°—46°.

III. Carduus, Linn. Thistle. Roots mostly fleshy and tapering, occasionally creeping. Stems upright, leafy, winged. The whole plant, viz., the leaves and wings of the stem, beset with numerous straight spines. Involucre tumid, imbricated with lanceolate spinous-pointed scales, permanent. Receptacle flat, hairy (fim-

briated scales). Florets perfect, equal, funnel-shaped. Fruit compressed, polished, obovate. Pappus sessile, on an annular rim, which crowns the fruit, either simple or feathery, deciduous.

SECT. I.—Pappus (down) rough.

1. **C. nutans**, Linn. Nodding Thistle. E. B. 1112, L. C. 595. Stems erect, winged, spinous, branching. Leaves pinnatifid, decurrent, with short lobes and long spines, usually with webbed down beneath. Peduncles downy or shaggy, bent at the top. Heads *large, drooping*, rarely erect, usually solitary. Involucre downy; lower bracts loose, *spreading or reflexed*; middle and upper ones refracted about their middle; all lanceolate, with strong, spinous points. Flowers purple, *odorous, rather handsome*. Not uncommon. On calcareous and cretaceous soils. Biennial. July—September.

A. 14, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—47°.

2. **C. acanthoides**, Linn. Welled Thistle. E. B. 973, L. C. 596. Stem angular, winged, hairy; wings spinous. Leaves hairy, especially beneath, pinnatifid; lobes angular, spinous; root-leaves tapering at the base into petioles; stem-leaves decurrent. Heads *small, ovate, in terminal clusters or close corymbs*. Involucre *somewhat cottony*; bracts spreading, linear, ending in weak spines. *Query*—Var. of *C. nutans*? Hedges and dry waste places. Annual. June, July.

A. 17, C. 70. Lat. 50°—60°. Alt. 0—350 yards. T. 52°—43°.

3. **C. tenuiflorus**, Curt. Small-flowered Thistle. E. B. 412, L. C. 597. Stems woolly or cottony, with *broad, sinuous, toothed or lobed spinous wings*, simple or branching near the top. Leaves pale green, with short hairs above, cottony below, deeply sinuated; lobes angular, with long spines, decurrent, extending below the internode. Heads *cylindrical, elongate*, not large, *sessile, aggregate*, rarely solitary. Involucre more or less pubescent, bracts *loosely imbricated*, curved above, ending in a slender spine. Flowers purple. Rubbish about towns and roadsides. Annual or biennial. June.

A. 15, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

SECT. II.—Down (pappus) feathery. *Cnicus*, Linn., Sm. *Cirsium*, Koch.

4. **C. lanceolatus**, Linn. Spear Thistle. Bur Thistle, *Burns*.* E. B. 107, L. C. 599. Stems stout, angular, downy or woolly, *more or less branching*. Leaves pinnatifid; lobes *triangular or lanceolate, armed with strong spines*; terminal lobe linear lanceolate, elongated. Heads solitary or aggregate, terminal, large, *ovate-conical*; involucre downy. Bracts lanceolate, subulate, spreading above, tapering into strong spines. Meadows, pastures, &c. Biennial. June—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—550 yards. T. 52°—41°.

5. **C. eriophorus**, Linn. Woolly-headed Thistle. E. B. 386,

* "The big *Bur Thistle* spreading wide
Among the bearded *bear*,
I turn'd the weeder-clips aside,
And spared the symbol dear."

L. C. 600. Stem erect, stout, angular, furrowed, branching, hairy, *not winged*. Leaves *pinnatifid, not decurrent*, with lanceolate segments, upper leaves with ovate or oblong (broader and shorter) lobes; all densely woolly beneath, the upper surface furnished with small adpressed spines, the margin sometimes spinous, the tips always terminating in strong spines, the lower leaves petioled, the upper sessile. Heads large, roundish, covered with a more or less dense web, with subulate, strongly spinous bracts. Waste places, on limestone soils. Biennial. June—September.

A. 10, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—47°.

6. **C. arvensis**, Linn. Field Thistle. E. B. 975, L. C. 602. Stem angular, *not winged*, much branched above; branches erect; both stem and branches leafy. Leaves glabrous, or clothed with very short hairs above, rather downy or cottony below, pinnatifid or sinuate, with divaricated lobes and strong spines; root-leaves tapering at the base, petioled; stem-leaves *sessile, clasping*, and auricled. Heads *not large, ovate*, in corymbose panicles; bracts ovate, *appressed*, terminated by a short, spreading, scarcely spinous point. Flowers pale purple, with a strong scent. Fields and rubbish. Biennial (?), perennial (?). July—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—450 yards. T. 52°—42°.

Var. β . *C. latifolius*. Leaves broad, glabrous, decurrent.

Var. γ . *C. setosus*. Leaves not decurrent, slightly woolly or hairy below, flat; lobes short, ovate; margins ciliate, with spines. Near Dunfermline.—Dr. Dewar.

A striking variety like *setosus* was collected at Battersea, not wild, but spontaneous. It was taken into the garden, where it rapidly spreads.—A. I.

7. **C. palustris**, Linn. Marsh Thistle. E. B. 974, L. C. 601. Stem flexible, angular, with *spinous wings*, hairy, simple or branching above. Leaves pinnatifid; the stem-leaves decurrent; the decurrent part lobed, spinous; the root-leaves more or less tapering into the petiole. Heads *small, ovate, contiguous*, terminal, often in a dense corymb. Involucre downy, cottony, *with erect, ovate-lanceolate bracts*, which end in spinous points. Flowers purple. Marshy woods and hedges. Biennial. June—August.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—800 yards. T. 52°—38°.

8. **C. Forsteri**, Sm. Forster's Thistle. L. C. 603. Stem angular, furrowed, winged, hairy, with deflexed hairs, branching above, branches erect. Leaves *decurrent, lanceolate, pinnatifid or lobed*, lobes cleft or entire, triangular, spinous, slightly hairy above, cottony below. Involucres ovate, terminal, two or three together, cottony, with diverging or horizontal spines, on densely cottony peduncles, which are enlarged at the apex. Receptacle slightly convex, nearly smooth. Florets cylindrical, with linear, equal segments. Style considerably longer than the corolla, notched at the apex. Fruit with a narrow rim and short beak. Down soft. Believed by some botanists to be a hybrid between *C. palustris* and *C. arvensis*.

A. 2, C. 2. Lat. 51°—52°. Alt. 50—100 yards. T. 49°—48°.

9. **C. pratensis**, Huds. Meadow Thistle. E. B. 177, L. C. 604. Stems usually twelve-eighteen inches high, occasionally three-four feet, quite simple, and one-, rarely two-flowered. Root-leaves *elliptic lanceolate, slightly toothed, and spinous on long tapering petioles*; stem-leaves sessile or clasping, two-four, similar to the root-leaves, only smaller. Parkhurst Forest, Isle of Wight, very plentiful and luxuriant; Windsor Forest; Wandsworth and Wimbledon Commons.

A. 8, C. 30. Lat. 50° — 54° (55°). Alt. 0—200 yards. T. 51° — 48° .

10. **C. tuberosus**, Linn. Melancholy Thistle. E. B. 2562, L. C. 605. Root fleshy. Stem erect, round, furrowed, hairy, not winged. Leaves pinnatifid, segments two-three-cleft, ovate, ciliated, with short spines at their tops, *sessile, not decurrent*. Involucre ovate, bracts closely imbricated and appressed, except at the very tips, scarcely spinous. Segments of the florets setaceous, linear. Wiltshire. Perennial. August.

A. 2, C. 2. Lat. 51° — 52° . Alt. (?). T. 49° — 48° .

11. **C. acaulis**, Linn. Dwarf Thistle. E. B. 161, L. C. 606. Root woody, truncate. Stem usually wanting; sometimes *six-eight inches high, without wings*, simple, leafy, one-flowered. Leaves pinnatifid, glabrous on the upper surface, more or less hairy beneath; root-leaves tapering below, with spinous, triangular, or sinuate lobes; stem-leaves not clasping. Heads ovate, terminal, solitary, rarely two-three. Bracts of involucre erect, lanceolate, the outer spinous. Flowers purple. Dry places. Perennial. July—September.

Note.—This species, both in habit and structure, is nearer to *C. arvensis* and *palustris* than to those among which it is placed.

A. 7, C. 25. Lat. 50° — 54° . Alt. 0—200 yards. T. 51° — 48° .

12. **C. heterophyllus**, Linn. Melancholy Thistle. E. B. 675, L. C. 607. Stems erect, simple, angular, downy or cottony, hollow, a yard or more in height. Root-leaves *lanceolate, tapering at both ends, very long*; stem-leaves clasping, *cordate, with large, rounded lobes, contracted about the middle*, tapering and pointed; all white and cottony below, glabrous above, ciliated, with minute prickles. Heads solitary (one on a stem), large, cylindrical. Bracts lanceolate, imbricated, pointed, not spinous. Fruit ovate, tapering, compressed, with a ring at the apex, crowned with long, silky fibres. Settle, Yorkshire, and Breadalbane, Perthshire; not unfrequent. Perennial. July, August.

A. 13, C. 30. Lat. 51° — 59° . Alt. 0—700 yards. T. 47° — 39° .

IV. **Silybum**, Gært. Milk Thistle. Annuals, with branching, spreading stems and large sinuate and spinous leaves, glabrous on both sides, and marked with white broad streaks. Involucre roundish. Bracts imbricated, outer lobed, spinous, inner ones ending in very long spinous points. Receptacle fleshy, scaly or hairy. Florets unequally five-cleft. Achenia glabrous, compressed, crowned with a pappus-bearing rim. Pappus in several rows, deciduous.

1. **S. Marianum**, Gært. Blessed Thistle. E. B. 976, L. C. 598. Stems stout, branching; branches spreading horizontally. Leaves

glabrous, shining, slightly downy beneath, marbled with white streaks in the direction of the nerves, pinnatifid or sinuate; lobes short, angular, ciliated, with stout spines; root-leaves narrowing into petioles, stem-leaves auricled, clasping. Heads roundish, very large; all the bracts except the five outer ones ending in very long, stout, reflexed spines. Roadsides near villages, waste places. Found usually in the vicinity of human dwellings. It appears to accompany man in all his migrations. Annual. July.

A. 13, C. 40. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

TRIBE II.—Crown of the seed persistent or falling off in separate portions, rarely absent. Down smooth or rough, never feathery, rarely chaffy, free, rarely united in a ring.

Genera.—*Arctium*, *Serratula*, *Saussurea*, *Centaurea*.

SYNOPSIS OF THE GENERA.

Arctium. Bracts of the round involucre terminating in hooked points. Scales of the receptacle rigid, pointed.

Serratula. Bracts of the involucre scaly, imbricated, not armed; flowers dioecious.

Saussurea. Florets all perfect. Down in two rows. Seeds without a rim.

Centaurea. Receptacle hairy. Florets of the circumference tubular, funnel-shaped, large, radiating, barren.

V. *Arctium*, Linn. Burdock. Large branching, downy, biennial plants, with alternate, simple leaves and terminal flowers. Involucre globose. Bracts *spinous, ending in hooked points*. Receptacle flat, covered with narrow, rigid scales. Florets with a long slender tube, and a limb divided into five linear, regular, spreading segments. Fruit oblong, four-sided, downy at the summit. Pappus short, rough, neither stipitate nor cohering into a ring at the base.

A. commune. *Lappa communis*, Tourn. *A. Lappa*, Linn. *A. Lappa and Bardana*, Sm., "Eng. Fl." E. B. 1228, 2478, L. C. 592, 592 b. Stem erect, stout, furrowed or angular, much branched, with short hairs. Root-leaves large, cordate at the base, entire, or sinuate; the upper-leaves ovate-lanceolate, attenuated at the base, all hairy above, downy or tomentose beneath. Heads globular, involucre glabrous or woolly. Waste places. Biennial. June—September.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—150 yards. T. 52° — 45° .

Var. *a. A. minus*. Heads small; involucre glabrous; bracts violet-purple on the inside. Scales of the inner florets not hooked, but terminating in a rigid point. Perthshire, near Scone.

Var. *b. A. majus*. Heads large, involucre glabrous; bracts green on the inside.

Var. *γ. A. tomentosum*. Heads moderately large, involucre woolly (with spider-web-like pubescence); bracts usually coloured on the inside.

A. Bardana (?) A. 18, C. 70. Lat. 50°—59°. Alt. 0—200 yards. T. 52°—46°.

Note.—Var. γ . is common in North Wales.

VI. **Serratula**, Linn. Saw-wort. Perennials. Stems upright. Leaves serrated or pinnatifid. Flowers diœcious, terminal, corymbose. Involucre cylindrical. Bracts lanceolate, sharp, but not spinous. Receptacle bristly. Fruit obovate. Pappus sessile, rough, in three or four rows, the inner longest; outer deciduous, not cohering at the base.

S. tinctoria, Linn. Saw-wort. E. B. 38, L. C. 594. Root crowned by the persistent nerves of the decayed leaves. Stem simple, erect, angular, smooth, branching only at the summit, leafy. Leaves pinnatifid, smooth above, roughish below; segments oblong or lanceolate, finely and sharply serrated; terminal lobe large, elongated, especially in the upper leaves; lower leaves petioled, upper sessile. Heads ovate-oblong, contiguous. Bracts lanceolate, pointed, closely appressed. Fruit smooth, ribbed, tapering below, constricted at the top, crowned with a row of dense spreading fibres. Woods, &c. Perennial. July—September.

A. 12, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—47°.

VII. **Saussurea**, D. C. Alpine Saw-wort, (Sm.) Stem simple, erect, round. Leaves variable. Flowers terminal, corymbose. Involucre oblong. Bracts unarmed. Receptacle flat, bristly, or chaffy. Anthers ciliated at the base. Fruit smooth, glabrous. Pappus in two rows; the outer short, rough, bristly, persistent, the inner feathery, slightly united at the base.

S. alpina, D. C. Alpine Saw-wort. E. B. 599, L. C. 593. Root tapering, blackish. Stem simple, erect, leafy, downy, three-twelve inches high. Lower leaves petioled ovate, toothed; upper ones sessile, rounded at the base, decurrent, lanceolate, very laxly toothed, green and smooth above, hoary and cottony beneath. Heads in a dense corymb. Involucre cylindrical, with ovate hairy bracts. Flowers pink with blue anthers. Down on the fruit long and feathered. On lofty mountains of Wales and Scotland. Perennial. July, August.

A. 7, C. 15—20. Lat. 53°—61°. Alt. 700—1300 yards. T. 41°—34°.

VIII. **Centaurea**, Linn. Knapweed, Blue-bottle, Star Thistle. Stems rigid, erect, or ascending, leafy, mostly branching. Leaves variable, but *never spinous* like *Thistles*. Flowers terminal or lateral, solitary, or contiguous. Involucre roundish. Bracts closely imbricated, with either scaly or ciliated margins (sometimes the scales are armed with very sharp, stout and long spines). Receptacle bristly. Florets of the disk or centre regular, perfect; florets of the ray irregular, larger than the central ones, imperfect, only the rudiments of a pistil being present. Fruit produced only by the central florets, very smooth. Pappus when present short, either bristly or feathery.

SECT. I.—*Cyanus*. Bracts of the involucre furnished with a scarious ciliated margin, not spinous. Flowers purple or blue, rarely white.

1. **C. Jacea**, Linn. (?) Brown Knapweed. E. B. 1678, L. C. Excluded Species, p. 16, List 3. Stems several or solitary, bluntly angular, simple or branched above, usually downy. Leaves rough on both sides, oblong lanceolate, entire or toothed, with a short mucro. Head roundish, ovate, solitary at the summit of the branches; bracts with a scarious, pale, deeply incised border, the scarious part of the lower covering the herbaceous part of the upper (*the lower bracts are ciliate pectinate, the upper simply incised*). Florets of the margin large, radiating, with furrowed linear-lanceolate segments. Coss. and Ger., "Flor. Par.," p. 392, unite the two forms, *C. Jacea* and *C. nigra*, Linn. Meadows, pastures, &c. Perennial. July—September.

A. 7. *Incognita* (unknown). The examples so called, or some of them at least, appear to be only a form of the following. The English examples totally disagree with Reichenbach's beautiful figures, *Centaurea jacea genuina*, Rehb., 754, &c., which represent the continental forms of this plant.

2. **C. nigra**, Linn. Black Knapweed. E. B. 278, L. C. 611. Stems erect, very rigid, hairy, branching. Leaves simple, oblong lanceolate, entire, toothed or sinuate, rarely pinnatifid, blunt, pointed, very rough at the margins; the lower tapering into long petioles, the upper sessile. Heads roundish, more or less numerous, terminal and solitary. Peduncles swelling above, hollow, with herbaceous bracts. Bracts of the involucre green, with a white scarious border, terminated with a large *membranous, black, nearly glabrous, ovate ciliated appendage*. Flowers purple, all equal, or those of the margin larger and radiating. Fruit white, finely downy, without a crown, or surmounted by a brownish plume. Meadows, &c. Perennial. June—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—450 yards. T. 52°—42°.

Var. *a. equalis*. Appendage of the bracts brown or black, oval, pectinate-ciliate, fringes longer than the width of the appendage. Florets all equal, perfect, rarely with barren, radiating, marginal florets. In some parts this is the common form.

Var. *radiata* (*nigrescens*?). L. C. 610. Stem slender, rough, with spreading hairs, branching. Leaves linear-lanceolate, tapering at both ends, nearly entire. Scales green, ribbed, with a triangular-ovate appendage. Fringes (teeth) twice as long as the breadth of the appendage, toothed. Florets of the ray all very long and spreading, deeply divided, barren. Parkhurst Forest, Newport, Isle of Wight. The common form in this locality.

A. 12, C. 25. Lat. 56°—58°. Alt. 0—200 yards. T. 52°—47°.

Note.—I have never seen the continental plant which the form above described is said to represent, and only surmise that it may be what is usually called *C. nigrescens* by British botanists.—

A. I.

3. **C. Cyanus**, Linn. Blue-bottle. Corn-flower. E. B. 277, L. C. 612. Stem erect, more or less branching, usually rigid, with a slight cottony down. Leaves invested with a silky, whitish down; the lower pinnatifid, with an elongated, lanceolate, terminal lobe, and very small lateral and linear lobes; the upper leaves linear, entire, sessile. Heads ovate, solitary, terminal, on long peduncles. Involucre glabrous; bracts with a scarious, coloured, incised margin. Flowers blue, rarely white, lilac or pink. Fruit surmounted by a reddish crown, about as long as the fruit (achenium). Fields. Annual. June—August.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—450 yards. T. 51° — 42° .

4. **C. Scabiosa**, Linn. Great Knapweed. E. B. 56, L. C. 613. Root black and woody. Stems stout, rigid, erect, nearly glabrous, angular, furrowed, two-three feet high. Leaves pinnatifid, with entire, toothed, or sinuate, pointed lobes, roughish on both sides, ending in a mucro (point). Heads roundish, ovate, not numerous, on long, furrowed, leafy peduncles; bracts surmounted by a black, deeply fringed border or appendage; herbaceous part of the bracts deep green. Florets of the margin large, radiating. Fruit downy, crowned with a short brownish plume. Borders of fields. Pastures. Perennial. July, August.

A. 15, C. 60. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

There is an uncommon variety with white flowers.

SECT. II.—*Calcitrapa*. Bracts of the involucre spinous; flowers yellow or purple, rarely white.

5. **C. solstitialis**, Linn. St. Barnaby's Thistle. E. B. 243, L. C. 616. Stem erect, spreading, rigid, interruptedly winged by the bases of the decurrent leaves, hairy or woolly. Leaves lanceolate-linear, contracted above their junction with the stem, rough, hairy, lower leaves lyrate. Heads ovate-roundish, solitary, on leafy peduncles. Involucre woolly; bracts terminated by a long central spine and shorter lateral ones (the spines on the upper are much longer than those on the lower bracts). Florets yellow. Fruit white, compressed; carpels of the centre crowned with a white setaceous plume, marginal carpels without a crown. Said to be naturalized in cultivated fields in the south of England. In a clover-field near Grays, Essex, September, 1857. Wandsworth steam-boat pier. Annual. August, September.

Note.—This species varies in the more or less wooliness of its stem and in the more or less broad wing.

A. 6. Alien.

6. **C. Calcitrapa**, Linn. Common Star Thistle. E. B. 125, L. C. 615. Root vertical, fleshy, tapering. Stems several, stout, erect or reclining, branching, not winged, very woolly. Leaves sessile, pinnatifid, with a winged rach, very woolly below; segments linear, toothed, unequal. Heads solitary, mostly sessile, distant. Involucre smooth; bracts terminating in (almost composed of) strong, spreading, channelled spines, which are more or less toothed at the base. Florets

purple. Fruit flat, *without a crown*. Waysides. Putney. Biennial. June—September.

Note.—The central and very stout long spine is furnished at the base with two-five lateral, small, short, simple or compound spreading spines.

A 4, C. 12. Lat. 50° — 53° (55°). Alt. 0—50 yards. T. 52° — 48° .

7. **C. Isnardi**, Linn. Jersey Star Thistle. E. B. 2256, L. C. 614. Stems erect or reclining, fluted, very much branched, woolly or cottony, branches divergent, leafy. Leaves lobed or toothed, pinnatifid for about half their length, some of the upper leaves nearly entire. Heads solitary, or nearly so, slightly woolly, on leafy peduncles; scales close, spinous; *spines reflexed, palmate*, all about the same length. Flowers *purple*. Channel Islands. Perennial. July, August. Sarnian.

The following is a description of the Wandsworth steam-boat pier form of this plant:—Roots annual. Stems prostrate-ascending, branched, leafy. Leaves linear-oblong, tapering below, the lower ones toothed, the upper entire, mucronate and ciliated, with short bristles. Flowers purple. Heads solitary, lateral and terminal. Scales palmately spinous, three-five. *Spines equal* or nearly so. Ray-florets spreading, reflexed, much longer than the central ones. Wandsworth steam-boat pier, with several exotic *Centaureas*. July—September.

Note.—The plant above described may be perennial in Jersey, where the climate is milder than in England. It is *not* perennial in the above-mentioned locality.

DIVISION II.—Corymbiferae. Plants rarely spinous. Florets either all tubular and perfect, or with those of the circumference ligulate, female and radiating, and the central ones tubular and perfect. Style not enlarged above. Stigmatic lines distinct, not confluent, not reaching the apex of the branch. Crown persistent or caducous, often reduced to a membranous rim. Receptacle with membranous scales or naked, sometimes deeply pitted.

TRIBE I.—Receptacle scaly. Fruit without a crown, sometimes with a spinous or chaffy ring. Anthers without basilar appendages.

Genera.—*Bidens*, *Achillea*, *Anthemis*, *Diotis*.

SYNOPSIS OF THE GENERA.

Bidens. Receptacle flat. Fruit compressed, angular, rough at the edges, terminating in two-five stiff rough bristles.

Achillea. Receptacle nearly flat. Florets of the circumference ligulate, short. Fruit compressed.

Anthemis. Receptacle convex or conical. Fruit tapering, with more or less prominent margins.

Diotis. Receptacle convex; fruit compressed, crowned with the persistent auricled tube of the corolla.

IX. Bidens, Linn. Bur-Marigold. Mostly annual plants. Stems upright. Leaves opposite, simple, or compound, lobed or ser-

rated. Flowers corymbose. Involucre flat, or nearly so. Bracts erect, parallel, channelled. Receptacle flat, beset with chaffy, deciduous scales. Florets all equal and uniform, tubular, with an ovate limb and five spreading segments. Fruit oblong, angular, compressed, with rough or prickly angles, and bearing on its summit *two or more hispid bristles*. Varieties are found with marginal florets.

1. **B. tripartita**, Linn. Three-lobed Bur-Marigold. E. B. 1113, L. C. 618. Stems erect, slightly angular or roundish, glabrous, simple or branching, branches opposite. Leaves *three-parted*, the lateral segments much smaller than the central and terminal ones, glabrous or rough only at the edges, toothed or serrated. Heads erect. Florets all tubular. Bracts leaf-like, the inner ones blackish-green, rigid, with a *narrow scarious margin*. Fruit compressed, with sharply serrated margins and two-three-four bristly serrated awns. Margins of ponds. Annual. August, September.

A. 15, C. 60. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—47°.

2. **B. cernua**, Linn. Nodding Bur-Marigold. E. B. 1114, L. C. 617. Stems erect or ascending, rooting at the base, cylindrical below, somewhat quadrangular above, simple or branching, smooth, or with only a few hairs. Leaves *lanceolate or linear-lanceolate, toothed*, sessile, or nearly so, the lower ones tapering at the base, and on short petioles, with erect teeth, sessile and half-clasping. Heads hemispherical, declining, terminating the stem and branches, subtended by five lanceolate, spreading or recurved, green, leaf-like bracts. Bracts of the involucre oblong, membranous, with a *broad scarious margin* (brown in the centre, veined with black lines, margins yellow). Florets tubular. Fruit *terminating in four-five, rarely three, awns*. In marshy places, edges of ponds and brooks. Annual. August—October.

Var. *B. radiata*. Florets of the circumference ligulate, usually about eight.

Both kinds of flowers are occasionally produced on the same plant, the heads bearing ligulate (strap-shaped) florets, being smaller and on the lower parts of the stem and branches.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

X. Achillea, Linn. Yarrow. Perennials, with serrated or pinnatifid leaves. Stems rigid, angular, leafy. Involucre ovate. Bracts ovate, acute, imbricated. Receptacle slightly convex, narrow, beset with acute scales. Florets of the ray from five to ten, *short and rounded, inversely cordate*, with a small intermediate lobe or tooth. Fruit obovate or oblong, with a filiform margin, without any margin or ring at the apex. The short broad florets of the ray afford a tolerably good distinction between this genus and *Anthemis*, with which it closely agrees in some of its characters.

1. **A. Millefolium**, Linn. Milfoil. Yarrow. E. B. 758, L. C. 672. Stems erect, rigid, usually simple, hairy or downy, furrowed. Leaves *bipinnate*, segments *very numerous*, linear, short, all pointed, hairy or downy. Heads small, numerous, in compact, terminal corymbs.

Involucre ovate, cylindrical; bracts with a brown margin. Florets of the ray (margin) about six, three-lobed or three-toothed, short, scarcely half so long as the involucre, usually white, sometimes pink. Dry banks. Perennial. July.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—1300 yards. T. 52° — 34° .

2. **A. Ptarmica**, Linn. Sneezewort. E. B. 757, L. C. 671. Stems decumbent at the base, erect above, round, almost glabrous and slightly downy. Leafy, branching. Leaves rough, *linear-lanceolate, finely and doubly serrated, with very sharp teeth*. Heads in terminal corymbs. Involucre hemispherical; bracts with a scarious margin. Florets of the margin white, eight-twelve, ovate, three-toothed, as long as the involucre. Moist meadows. Perennial. July.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—700 yards. T. 52° — 40° .

A. decolorans, Schr. *A. serrata*, Sm. Serrated Yarrow. E. B. 253, L. C. p. 15, A. Like *A. ptarmica*, but with more deeply serrated leaves and with small pale yellow or buff coloured flowers. Near Matlock, Derbyshire. Perennial. August.

A. tomentosa, Linn. Yellow Milfoil. E. B. 2532, L. C. p. 15, A. Stem erect, leafy and woolly, simple, with barren lateral shoots from

My Handsworth plant is
like an *Anacyclus*. but not
radiatus which has a yellow flr.
It is like *Anthemis secundanema*
Rech. 115 vol 16.

I have seen *Echinops*
growing wild at There

A. arvensis may always be distinguished from it by its lax procumbent habit, generally larger and fewer flowers, that are on long hairy peduncles, which are a little enlarged upwards, and not disposed in the same paniced or corymbose manner as in that species."

The same accurate observer informs us that this plant is cropped down closely by sheep, and that the plant "should be encouraged in clover and grass fields, as its sweet aromatic qualities are probably salutary to stock of most kinds."

A. maritima or *A. anglica*, seen on the coast, Mr. Watson states, "was probably only *Pyrethrum maritimum*." (See "*Cybele*," vol. ii., p. 129.)

2. **A. Cotula**, Linn. Stinking May-weed. E. B. 1772, L. C. 669. Stems ascending or erect, branching, glabrous or slightly downy, angular. 'Leaves pinnate or bipinnate, with linear *elongate* spreading segments, which are either entire or slightly cleft, glabrous, or rather downy. Heads solitary, on long slender peduncles. Bracts of the involucre with broad scarious margins. Scales of the receptacle scarious, with a herbaceous nerve, *subulate*; receptacle *conical*, *pointed*. Florets of the margin *barren*. Fruit light brown, with ten ridges, cut into prominent tubercles, without a rim. Fields and rubbish. Annual. June—September.

A. 16, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

3. **A. tinctoria**, Linn. E. B. 1472, L. C. Excluded Species. Stem *erect, rigid*, round, with many erect branches, downy. Leaves pinnate, with pinnatifid leaflets, and ovate, acute, mucronate, downy segments. Flowers solitary, on long downy stalks, bright yellow; marginal florets short, furrowed, toothed or notched at the tips. Central florets tubular, with acute, spreading lobes. Bracts unequal, all silky, the outer pointed, the inner blunt, with scarious edges. Receptacle bluntly conical or conico-hemispherical, with long-pointed scales. Fruit quadrangular, crowned with a membranous, entire border. Fields and stony places. Biennial(?). August—October. Wandsworth steam-boat pier.

A. 3. Alien.

4. **A. nobilis**, Linn. Common or Official Chamomile. E. B. 602, L. C. 667. Root *horizontal, creeping, perennial*. Stems solitary or several, spreading, ascending or erect, always with more or less upright flower-stalks, branched, leafy at least below, downy. Leaves pinnate, with a thick, fleshy, common petiole, and divaricating, linear, thick, short-pointed segments. Heads solitary. Bracts thin, scarious at the margins and top. Scales of the receptacle oblong-linear, obtuse, or torn at the apex. Florets of the margin channelled, obtuse, and somewhat notched. Tube of the central florets covering nearly half the fruit. Fruit yellowish brown, *with three filiform ridges*. Whole herb, when bruised or crushed, emitting a powerful odour. Commons. Perennial. July.

A. 13, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—48°.

XII. **Diotis**, Desf. Cotton-weed. Perennial, densely cottony plants, with branching stems, and corymbose yellow flowers. Involucre

hemispherical. Bracts convex, obtuse, imbricated. Receptacle convex, nearly globular, beset with oblong, concave, downy-tipped scales. Florets all uniform, regular, tubular, level at the top, with a five-cleft limb, and spreading equal segments. The tube of the corolla is furnished with two ears (hence the generic name) at the base, and these separate from the tube, and adhere to the ovary. The fruit is without down.

D. maritima, Cass. Sea Cotton-weed. E. B. 141, L. C. 621. Roots deeply penetrating. Stems round, cottony, and leafy, recumbent at the base, about a foot high. Leaves scattered, oblong, obtuse, crenate, thick, densely cottony. Flowers yellow, in terminal, corymbose tufts. Involucres densely cottony. Fruit brown. Sandy seashores. Perennial. August, September.

A. 3, C. 4. Lat. 51° — 54° . Alt. 0. T. 50° — 49° .

TRIBE II.—Receptacle not chaffy. Fruit not crowned with silky fibres. Anthers usually without basilar appendages.

Genera.—*Pyrethrum*, *Chrysanthemum*, *Bellis*, *Artemisia*, *Tanacetum*.

SYNOPSIS OF THE GENERA.

Pyrethrum. Involucre hemispherical. Fruit angular, with an elevated membranous crown.

Chrysanthemum. Receptacle and involucre as in *Pyrethrum*. Fruit tapering, without a crown, or crowned, with three minute teeth.

Bellis. Receptacle conical. Fruit compressed, without a crown.

Artemisia. Florets all tubular. Fruit obovate, crowned with a small disk.

Tanacetum. Florets all tubular. Fruit oblong, crowned with a large disk.

XIII. **Pyrethrum**, Gært. Feverfew. Ox-eye. Leaves pinnate or bi- or tri-pinnate, rarely simple, crenate and toothed. Heads solitary and terminal, sometimes in a corymb. Ray-florets white, often refracted; tubular (disk) florets yellow. Involucral bracts imbricated. Receptacle conical, hemispherical, or more or less convex, naked (without scales). Fruit uniform, nearly quadrangular or cylindrical, never with lateral wings, with a rim or membranous crown, or without this appendage.

SECT. I.—*Matricaria*. Annuals. Leaves two-three-pinnate, with long linear segments. Receptacle ovate-conical, or conical-hemispherical. Fruit two-three-ribbed on the inner side.

1. **P. Chamomilla**, Gært. Coss. and Ger. *Matricaria Chamomilla*, Linn. Wild Chamomile. E. B. 1232, L. C. 665. Stems rigid, quite smooth, erect or ascending, branching above. Leaves bipinnate, with *filiform* or *linear* (capillary) *pointed leaflets*, all glabrous. Heads solitary, on long furrowed or angular peduncles, with a strong, unpleasant smell. Bracts of the involucre *oblong*, scarious at the borders. Receptacle hollow, *pitted* or *warted*, ovate-conical, *pointed*. Ray-florets pure white, elongate, ribbed; disk-florets tubular, yellowish-

green. Fruit small, whitish-yellow, *cylindrical, somewhat triangular*, slightly curved, with five filiform edges on the inner side, and a laterally oblique disk, crowned with a blunt or sharp rim. Fields and waste places. Annual. June, July. The whole herbage of this species is of a very deep dark green, and quite smooth.

A. 14, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—47°.

2. **P. inodorum**, Sm. *Chrysanthemum*, Linn. Scentless Feverfew. E. B. 676, L. C. 664. Stems erect, ascending or spreading, branching often from the base, glabrous. Leaves bipinnate, with spreading, elongated, *setaceous* segments, *clasping at the base*, glabrous. Heads usually numerous, solitary, on long, more or less leafy peduncles. Outer bracts *lanceolate*, inner ones broader, with dilated scarious margins. Receptacle conical, *rounded*. Fruit *quadrangular*, slightly compressed, uniform, with a sharp rim, its apex presenting the appearance of a rhomboid, with one of the angles flattened. There are two yellowish glands on the outer side, below the rim, which become black and depressed when the fruit is ripe. Fields and waste places. Annual. June—August.

Note.—The ray-florets are not more than half as long as the ray-florets of *P. Chamomilla*.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—450 yards. T. 52°—42°.

3. **P. maritimum**, Sm. Sea Feverfew. E. B. 979, L. C. 664 b. Stems stout, round, and smooth, ascending. Leaves bipinnate; leaflets (segments) linear-channelled, spreading in all directions, fleshy. Involucre somewhat hemispherical; bracts lanceolate, obtuse, keeled, with scarious margins. Ray-flowers large, linear, furrowed, white; central florets greenish-yellow. A variety of *P. inodorum*? Seashores. Annual. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—450 yards. T. 52°—42°.

SECT. II.—Perennials. Leaves compound or simple. Receptacle convex, or nearly hemispherical. Fruit with ridges on all sides.

4. **P. Leucanthemum**, Coss. and Ger. *Chrysanthemum Leucanthemum*, Sm. Great Ox-eye Daisy. E. B. 601, L. C. 662. Stems more or less numerous from the same root, or solitary, *erect*, or reclining at the base, simple, or with long erect branches. Leaves at the base *obovate or spathulate*, on long tapering petioles, toothed, crenate, or incised; stem-leaves *oblong, dilated at the base*, and sessile, partly embracing the stem, deeply toothed or pinnatifid. Heads large, broad, solitary, terminal. Bracts herbaceous, with a narrow, brown-black, scarious margin. Receptacle convex or nearly hemispherical. Fruit (achenia) nearly cylindrical, black, with a rim at the apex. Meadows and hedges. Perennial. May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—700 yards. T. 52°—41°.

5. **P. Parthenium**, Sm. Feverfew. E. B. 1231, L. C. 663. Stems solitary or several, erect, branching, especially above, glabrous or downy. Leaves pinnate below, pinnatifid above, petioled, segments (leaflets) ovate-oblong, the lower pinnatifid, the upper incised or toothed, confluent, downy. Heads numerous, corymbose. Bracts

scarious. Receptacles convex. Fruit pale or brown, crowned with a membranous toothed rim. Usually near dwellings. Perennial. July.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

XIV. Chrysanthemum, D. C. Marigold. Leaves deeply toothed, rarely pinnate. Heads solitary, terminating the stem and branches. Bracts of the involucre imbricated. Receptacle *only slightly convex, naked*. Fruit not uniform, that of the ray winged, of the disk (centre) nearly cylindrical, with ten equal ridges, or with a narrow wing near the base, without any rim at the apex.

C. segetum, Linn. Corn Marigold. E. B. 540, L. C. 661. Stems erect, simple, branching above, sometimes branched at the base, glabrous, rather succulent, leafy. Leaves oblong, glaucous, fleshy, incised or toothed; upper leaves clasping. Heads large, solitary, terminating the stem and branches. Bracts scarious in their upper half. Florets of the margin *bright yellow*, broad, toothed. Fruit yellow, nearly cylindrical; fruit of the margin with two lateral thick wings and seven-eight sides; that of the centre with ten equal sides. Corn-fields. Annual. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—300 yards. T. 52°—44°.

C. coronarium, Linn. *Pinardia coronaria*, Less. Stems erect, much branched. Leaves pinnatifid, with linear pointed alternate segments. Ray-florets large, *white, orange-yellow at their base*, and about one-third of their length from the base. Achenia short, angular (lozenge-shaped). Receptacle pitted, and the pits are surrounded with a quadrangular border. The carpels and receptacle are quite smooth. Wandsworth steam-boat pier. Very abundant. Annual. September.

XV. Bellis, Linn. Perennial, almost stemless plants. Leaves in rosettes, on very short stalks. Heads solitary, on axillary or nearly radical peduncles. Flowers of the ray white or rose-coloured, those of the disk yellow. Bracts of the involucre equal. Receptacle conical, elongate, without scales (naked). Florets of the ray (circumference) ligulate (strap-shaped), female, fertile; florets of the disk (centre) perfect (both male and female). Fruit (achenia) obovate, compressed, surrounded with a prominent obtuse border, and without a membranous crown.

B. perennis, Linn. Common Daisy. E. B. 424, L. C. 660. Root usually branching, stoloniferous. Stems very short, either under or above ground, leafy, usually ascending. Leaves in a rosette, apparently radical, but truly cauline (borne on the stem), obovate-spatulate, tapering into petioles. Peduncles axillary, or almost radical, much longer than the leaves. Bracts of the involucre herbaceous. Ray-florets white, often tipped with red (rose colour). Fruit slightly hairy. Meadows and pastures. Perennial. March—November.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards. T. 52°—38°.

Note.—This is an example of a common plant. It is almost ubiquitous.

XVI. *Artemisia*, Linn. Wormwood, Southern-wood, Mugwort. Herbaceous or shrubby plants, with very inconspicuous flowers, and bitter and often aromatic properties. Leaves variable, but more or less divided, rarely undivided, usually hoary or silky. Flowers in paniced racemes or tufts, very inconspicuous. Involucre ovate, roundish. Bracts convex, compact, rounded, membranous at the edges. Florets of two kinds; those of the disk numerous, tubular, with a five-cleft limb; those of the ray few, with an undivided ligulate limb. Fruit obovate, without down.

1. ***A. vulgaris*, Linn.** Mugwort. E. B. 978, L. C. 626. Stems erect, branching above, pubescent or nearly glabrous. Leaves pinnate or bipinnate, with *oblong-lanceolate* segments, *whitish and tomentose beneath*; stem-leaves auricled at the base. Heads subsessile, ovate-oblong. Involucre tomentose. Receptacle *glabrous*. Waysides, fields, &c. Perennial. July—October.

2. ***A. Absinthium*, Linn.** Common Wormwood. E. B. 1230, L. C. 625. Stems *woody*, erect, stout, branching above, clothed with white, silky down, leafy. Leaves hoary, *silky on both sides*, the lower on long petioles, *pinnate, with pinnatifid leaflets*, segments broad, obtuse, toothed or lobed; upper leaves trifid, on broad petioles, half-clasping, or entire lanceolate and sessile. Heads roundish, hemispherical, peduncled, drooping, in panicles or clusters. Involucre slightly downy (glabrous). Bracts herbaceous ovate blunt with scarious margins. Receptacle convex, with long silky hairs. Whole plant strongly aromatic. Apparently naturalized on waste ground or rubbishy places, near houses and villages. Perennial. August.

A. 14, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—48°.

3. ***A. campestris*, Linn.** Field Southernwood. E. B. 338, L. C. 623. Stem rigid, ascending, slender, much branched, *glabrous*, angular. Leaves one-two, pinnate, segments linear, silky when young, glabrous when mature. Heads *small, numerous, on short pedicels, ovate*. Bracts of the involucre glabrous, shining, purplish. Florets yellow. Involucre glabrous. Sandy heaths, Norfolk and Suffolk. Perennial. August, September.

A. 1, C. 2. Lat. 52°—53°. Alt. 0—50 yards. T. 49°—48°.

4. ***A. maritima*, Linn.** Sea Wormwood. E. B. 1706, L. C. 624. Stems ascending, branched, *woody, rigid, woolly or hairy*. Leaves pinnatifid, with linear, blunt segments, hoary, downy. Heads small, oblong-lateral and terminal, mostly on one side of the branches or branchlets. Bracts fleshy, unequal, obtuse.

A. 15, C. 30. Lat. 50°—57°. Alt. 0. T. 52°—48°.

Var. *gallica*. E. B. 1001. Clusters of heads denser, and more erect.

Var. *salina*. Heads drooping.

Note.—This differs but slightly from *A. Absinthium*.

XVII. *Tanacetum*, Linn. Tansy. Bitter, strongly aromatic plants. Stems tall, upright and leafy. Leaves simple, pinnate

or bipinnate. Flowers corymbose, forming a level disk. Involucre hemispherical. Bracts elliptic-oblong, compact, imbricated, membranous at the margin. Receptacle convex, naked, dotted. Florets of the disk tubular, level-topped; *florets of the ray few*, sometimes *absent*, with a flat three-cleft limb. Fruit oblong, angular, with a slight membranous margin.

T. vulgare, Linn. Common Tansy. E. B. 1229, L. C. 622. Stems robust, erect, branching above. Leaves almost glabrous, bipinnatifid; lobes lanceolate, deeply serrate. Surface rough with depressions; rach winged, or winged and lobed. Heads numerous in compact branching corymbs. Bracts of the involucre glabrous, scarious at the apex. Fruit crowned with a membranous, obscurely toothed rim. Riversides and waste places. Perennial. July, August.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—42°.

TRIBE III.—Receptacle naked or chaffy only at the circumference. Fruit with a plume of fine silky fibres. Anthers with or without basilar appendages.

SUB-TRIBE I.—Anthers with basilar appendages.

Genera.—*Filago*, *Gnaphalium*, *Antennaria*, *Pulicaria*, *Inula*.

SYNOPSIS OF THE GENERA.

Filago. Plants annual, downy; heads small. Florets all tubular, intermixed with the bracts of the involucre; outer ones female. Fruit cylindrical, with a crown of silky hairs.

Gnaphalium. Plants annual or perennial, downy. Florets tubular, never intermixed with leaflets of the involucre.

Antennaria. Plants perennial, dioecious. (Male and female florets on distinct plants.)

Pulicaria. Florets of the circumference female, ligulate. Fruit with two rows of rough fibres, the exterior united.

Inula. Fruit with a single row of slightly rough hairs.

XVIII. **Filago**, Desf. Cotton-weed. Annual, usually branched, more or less tomentose plants. Leaves quite entire alternate. Flowers either axillary or on the apex of the branches. Involucre somewhat conical. Bracts imbricate lanceolate. Receptacle conical, elongated, filiform (Endlich.), scaly, the scales of the receptacle being mixed with the inner scales of the involucre. Achenia (fruit) tapering, not quite smooth. Pappus of the central florets filiform, that of the marginal florets none or unequal.

1. **F. germanica**, Linn. Erect Cudweed. L. C. 635. Stems several or solitary, usually simple, *erect*, woolly or cottony, leafy. Leaves lanceolate or oblong-lanceolate, revolute, densely cottony, imbricated. Heads round, sessile, terminating the stem, which gives out *two-three or several branches just below the terminal head*; each of these branches is also terminated by a smaller round head.

Flowers yellowish; bracts ending in long, sharp, smooth points. Waysides, &c. Annual. June—September.

A. 17, C. 75. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

2. **F. apiculata**, G. Sm., "Phytologist," vol. ii., p. 575. *F. Jussiei*, Coss. and Ger., "Illustr. Fl. Par.," Fig. 26 A. L. C. 635*. Stem branching from the base, usually forked, but sometimes three-forked (three branches from the same point), branches spreading or divaricated, rather leafy. Leaves oblong, rather distant, more or less spreading, slightly silky, flat or revolute at the edge only. Clusters hemispherical, composed of fewer heads than *F. germanica*, and subtended by a leafy involucre. Heads with five very prominent angles, attached to each other at their base, distinct, spreading and radiate above, not immersed in thick down as the former. Bracts acutely angled without, concave within, surmounted by a long, sharp, subulate point. Sandy places. Annual. July—September. Near Walton-on-Thames. Only recently distinguished from the former.

A. (?), C. (?). Lat. 50° — 54° . Alt. 0—200 yards.

3. **F. spathulata**, Presl. Spathulate-leaved Cudweed. L. C. 635*. Plant bushy; stems branching from the base; branches spreading, woolly and more or less leafy. Leaves oblong, or somewhat obovate or spathulate, with a short point, slightly reflexed at the margin, densely woolly. Heads round, mostly sessile; outer bracts (scales) of the involucre leaf-like; inner yellow, scarious, with a long subulate point. West Moulsey, Surrey. Annual. July—September.

A. (?), C. (?). Lat. 50° — 53° . Alt. 0—200 yards. T. 51° — 48° .

4. **F. minima**, Fries. Least Cudweed. E. B. 1157, L. C. 634. Stems erect, leafy, and cottony, twice-forked, four-nine inches high. Leaves numerous, small, sessile, linear-lanceolate, flat, pointed, downy or cottony on both sides, pointed or mucronate, somewhat appressed. Heads ovate, axillary, lateral and terminal (some are in the forks). Bracts of the involucre lanceolate; outer ones ovate, very short, barren. Sandy and gravelly places. Annual. June—September.

A. 17, C. 75. Lat. 50° — 58° . Alt. 0—250 yards. T. 52° — 44° .

5. **F. gallica**, Linn. Narrow-leaved Cudweed. E. B. 2369, L. C. 633. Stems several or solitary, erect, irregularly branched below, forked above, cottony, leafy, three-six inches high. Leaves linear-subulate, scattered, nearly erect, cottony. Heads small, ovate, with obtuse angles, and separated by more or less deep concavities, in axillary clusters, surpassed by the leaves; some in the forks, others lateral. Involucre densely covered with long silky down, scarious and brown above. Bracts of the involucre not pointed, spreading when the fruit is ripe, the outer ones ovate, very short. Corn-fields, Berechurch, Essex. Annual. July—September.

A. 1, C. 2. Lat. 51° — 52° ; Alt. 0—50 yards. T. 49° .

XIX. **Gnaphallum**, Linn. Cudweed. Herbaceous, rarely

shrubby, more or less woolly or tomentose plants. Stems variable. Leaves sessile or decurrent. Flowers terminal or axillary, in fascicles, corymbs, or spikes. Involucre ovate. Bracts imbricated, scaly, white, purple, or yellow. Receptacle flat, naked. Anthers with two setæ at the base. Stigma obtuse. Achenia tapering. Pappus in one row, equal, scarcely scabrous.

1. ***G. luteo-album***, Linn. Jersey Cudweed. E. B. 1002, L. C. 629. Stems several, more or less branched or simple, recumbent at the base, ascending or erect, cottony, leafy. Leaves linear-oblong, upper ones rounded at the base and lanceolate, wavy at the margin, half-clasping, cottony on both sides. Heads in dense, leafless clusters; bracts scarious, shining, with an ovate green rib. Florets yellow. Receptacle convex, tuberculate. Fruit small, crowned with rough fibres. A doubtful native. Annual. July—September.

2. ***G. uliginosum***, Linn. E. B. 1194, L. C. 632. Stem simple or branched at the base, round, clothed with long silky hairs, leafy. Leaves elongate, spathulate, silky on both sides and wavy at the margin. Cluster terminal, much shorter than the leaves. Heads ovate-cylindrical, at the ends of the branches and stem; bracts ovate or lanceolate, scarious, greenish-black, rather longer than the florets. Wet fields, and especially where water has previously been. Annual. July—October.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—46°.

3. ***G. rectum***, Sm. *G. sylvaticum*, Linn. Upright Cudweed. E. B. 124, L. C. 630. Root oblique, crowned with a tuft of leaves. Stem ascending, rigid, simple, leafy to the top, six inches to two feet high. Leaves linear or linear-lanceolate, cottony on both sides, sometimes less so above. Heads in axillary spikes, rarely solitary, in a spike-like panicle. Bracts of the involucre (scales) brown at the tops, the outer bracts shorter than the inner ones. Upland woods. Perennial. July—September.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—550 yards. T. 51°—41°.

Var. *G. norvegicum*, *G. sylvaticum*, Sm., is the alpine form of this species.

4. ***G. supinum***, Linn. Dwarf Alpine Cudweed. E. B. 1193, L. C. 631. Roots creeping, brownish. Barren stems prostrate, very leafy; flowering stem erect, with one-three heads (one-five), leafy at the base, naked above, very downy, slender, two-four inches high. Root-leaves in tufts, about the base of the stalks or barren stems, linear, cottony on both sides. Heads lateral and terminal or solitary and terminal. Involucre ovate. Bracts greenish, with a scarious, black margin, ovate. Not unfrequently found with a single terminal head. Summits of the highland mountains. Ben Lawers. Perennial. July.

A. 4, C. 15. Lat. 56°—60°. Alt. 500—1450 yards. T. 42°—33°.

XX. *Antennaria*, Br., Gært. Cudweed. Herbs or shrubs. Found mostly in the temperate and cooler parts of the northern hemisphere. Leaves alternate, quite entire, tomentose on the under

side. Inflorescence diœcious or sub-diœcious, corymbose. Involucre hemispherical? Bracts imbricated, scarious, or coloured at the apex. Receptacle convex, punctured. Male florets tubular, female ones filiform, with a five-cleft limb. Achenia tapering. Pappus in one row. That of the male flowers clavate; of the female setaceous.

1. **A. margaritacea**, Linn. Pearly Everlasting. American Cudweed. E. B. 2018, L. C. 628. Stems erect, round, filled with pith, densely cottony and leafy, branching above, one-two feet high. Leaves linear-lanceolate, acute, with a prominent midrib and a thin, cottony covering. Heads numerous, in flattish-topped corymbs. Bracts of the involucre ovate-lanceolate, spreading, of a pure or paper-like whiteness, globular before expansion. Florets yellow. Naturalized (?). Perennial. August.

A. 2, C. 5. Lat. 51° — 52° . Alt. 0. T. 48° .

2. **A. dioica**, Linn. Mountain Cudweed. E. B. 267, L. C. 627. Roots fibrous. Stems erect, branched at the top, leafy and cottony, *five-eight inches high*, with barren shoots. Leaves obovate on the shoots, lanceolate on the flowering stems, green above, white and cottony beneath. Flowers elegant, white, with a reddish shade. Bracts membranous. A very handsome species. Heathy, mountainous places. Perennial. June—September.

A. 17, C. 60. Lat. 50° — 61° . Alt. 0—950 yards. T. 51° — 37° .

XXI. Pulicaria, Linn. Fleabane. Erect branching plants, with alternate, cordate-lanceolate or sagittate, entire or toothed leaves. Inflorescence terminal; peduncles single-flowered. Involucre hemispherical. Bracts laxly imbricated, linear. Receptacle flattish, naked, areolate (marked into distinct angular spaces). Achenia tapering. Pappus in two rows; outer short, cup-like, membranous, toothed; inner pilose (rough).

1. **P. vulgaris**, Gært. *Imula Pulicaria*, Linn. Small Fleabane. E. B. 1196, L. C. 659. Stem erect, branching from near the base; branches erect or ascending, round, hairy, leafy. Leaves oblong-lanceolate, undulate, sessile, the upper ones half-clasping the stem. Heads roundish, lateral and terminal. Involucre hemispherical-roundish, hairy or downy, with linear, narrow bracts. Florets of the margin *very short, but slightly longer than those of the centre*. Seeds crowned with a laciniated rim. Moist, inundated, gravelly or sandy places. Annual. July—September.

A. 4, C. 20. Lat. 50° — 53° . Alt. 0—100 yards. T. 51° — 48° .

2. **P. dysenterica**, Gært. Common Fleabane. E. B. 1115, L. C. 658. Stems stout, erect, branching, downy below, woolly above, leafy. Leaves oblong-lanceolate or ovate-lanceolate, laxly toothed, *enlarged, cordate and clasping at the base*, sometimes arrow-shaped, hoary, cottony below. Heads large, hemispherical, terminal; involucre downy, woolly or cottony; bracts linear, subulate. Florets of the margin radiant, much longer than those of the centre. Banks of hedges and ditches. Perennial. August, September.

A. 15, C. 50. Lat. 50° — 56° . Alt. 0—200 yards. T. 52° — 48° .

Note.—This is one of the most abundant plants in the Isle of Wight. In August every wayside bank is yellow with its flowers.

XXII. *Inula*, Gært. Elecampane. Perennial, rarely biennial or annual plants. Stems upright. Leaves alternate, usually amplexicaule, simple, either quite entire or toothed. Inflorescence solitary or corymbose. Flowers yellow. Involucre hemispherical. Bracts imbricated in several series. Receptacle flat, or slightly convex, naked. Florets of the margin ligulate or sub-tubular, with a three-cleft limb. Anthers with two bristles at the base. Achenia tapering, slightly four-angled. Pappus in one row, equal and slightly scabrous.

SECT. I.—Inner bracts oblong, obtuse. Flowers of the margin long, ligulate. Fruit nearly quadrangular.

1. ***I. Hellenium*, Linn.** Elecampane. E. B. 1546, L. C. 655. Root thick, fleshy. Stem erect, stout, branching above, woolly or downy. Leaves *large, downy-whitish below*; root-leaves *oblong, tapering at both ends*, on long petioles; stem-leaves ovate-pointed, half-clasping, auricled or slightly decurrent. Heads large, few; outer bracts broadly ovate, acuminate, very downy, inner ones membranous, oblong, blunt, or truncate. Florets of the margin *linear, narrow, channelled, toothed*. Fruit smooth, with a roughish downy crown. Naturalized (?). North Wales, near Dolgelly, apparently wild; Quarr Abbey, near Ryde, Isle of Wight. Perennial. July, August.

A. 10, C. 25. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—48°.

SECT. II.—Inner bracts lanceolate or linear pointed. Florets of the margin tubular, scarcely ligulate. Fruit almost cylindrical.

2. ***I. Conyza*, D. C.** *Conyza squarrosa*, Linn. Plowman's Spikenard. E. B. 1195, L. C. 656. Stem erect, simple, branching above, two-three feet high, striated, downy. Lower leaves petioled, attenuated at the base, oblong, slightly toothed or entire, downy, soft, upper leaves sessile. Heads ovate, cylindrical, numerous, in terminal corymbs. Outer bracts short, ovate, pointed, reflexed at the tips; inner bracts linear, pointed, scarious at the tips, erect, much longer than the outer ones. Florets of the margin *scarcely ligulate, not longer than the central ones* (some of the ray-florets are tubular and some ligulate). Fruit hairy; crown white. Dry, chalky, shady places. Biennial. July, August.

A. 11, C. 40. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—47°.

3. ***I. crithmoides*, Linn.** Golden Samphire. E. B. 68, L. C. 657. Stem erect, simple, round, leafy. Leaves *fleshy, linear*, scattered, entire or three-toothed at the apex. Peduncles scaly, swollen above, with solitary flowers. Scales of the involucre linear, with long, tapering points. Florets of the ray linear, narrow; those of the disk *orange-coloured*. Muddy, salt marshes. Isle of Sheppey. Perennial. August, September.

A. 6, C. 15. Lat. 50°—55°. Alt. 0. T. 52°—49°.

SUB-TRIBE II.—Anthers without basal appendages.

Genera.—*Aster*, *Solidago*, *Erigeron*, *Linosyris* (*Chrysocoma*), *Doronicum*, *Cineraria*, *Senecio*, *Eupatorium*, *Tussilago*, *Petasites*.

SYNOPSIS OF THE GENERA.

Aster. Receptacle flat, pitted. Florets of the circumference in a single row.

Solidago. Florets of the circumference in a single row, five-ten. Seeds with a crown of silky hairs.

Erigeron. Florets of the circumference numerous, in several rows.

Linosyris. Receptacle slightly convex, deeply pitted. Florets all tubular, deeply five-cleft.

Doronicum. Florets of the circumference ligulate, female, with a crown to the seeds. Seeds of the tubular central florets crowned with short silky hairs.

Cineraria. Seeds of both exterior and central florets crowned.

Senecio. Receptacle nearly flat, naked. Fruit almost cylindrical, furrowed, all crowned.

Eupatorium. Florets few, all tubular. Fruit with a crown of one row of silky hairs.

Tussilago. Exterior florets very narrow, female, in several rows. Seeds crowned with several rows of fine silky hairs.

Petasites. Florets all tubular; females mostly in the centre, and males mostly in the circumference.

XXIII. *Aster*, Linn. Starwort. Michaelmas Daisy. A large genus of plants, chiefly of American origin. Many of them are cultivated. Stems erect, branching, virgate. Leaves simple, entire (?) or toothed. Flowers corymbose, blue or purple, rarely white. Receptacle flat, naked, alveolate and toothed. Florets of the ray more than ten, two-three-toothed, finally revolute. Fruit obovate, compressed. Pappus sessile in many rows.

A. *Tripolium*, Linn. Sea Starwort. E. B. 87, L. C. 641. Stems erect, glabrous, hollow below. Leaves linear-lanceolate, fleshy, entire, quite smooth and shining. Flowers blue, corymbose. Involucre cylindrical; bracts obtuse. Florets of the margin blue, toothed, of the disk yellow. Ray-florets often wanting. In muddy, salt marshes. Perennial. July, August.

A. 18, C. 50. Lat. 50°—58°. Alt. 0. T. 52°—47°.

XXIV. *Solidago*, Linn. Golden-rod. A numerous genus, chiefly American, agreeing in habit, foliage, and flowers with *Aster*, only the flowers of the ray are not blue, as in that genus, but yellow, and sometimes white. Involucre composed of *scabrous, closely imbricated, and not spreading*, bracts. Receptacle naked (slightly pitted)—Sm. Fruit tapering (obovate-oblong)—Sm. Pappus pilose, rough, in one row.

S. *Virga-aurea*, Linn. Golden-rod. E. B. 301, L. C. 642. Stems rigid, erect, roundish, slightly downy, branching above. Lower leaves oblong or ovate-oblong, attenuated below; stem-leaves oblong,

tapering at both ends. Heads in terminal, oblong, close panicles, erect. Florets deep yellow; those of the margin spreading, reflexed, elliptical, lanceolate, notched; those of the centre with acute, reflexed segments. Heaths, commons, woods. Not rare. Perennial. August.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1000 yards. T. 52°—37°.

Var. *latifolia* (?), Koch. Stem two-three feet high, branching from below the middle; branches paniced-corymbose, erect. Lower leaves deeply toothed or serrated, with fringed petioles; upper leaves entire, lanceolate. Heads numerous, corymbose, clustered. Florets of the margin five-seven, lanceolate, elongate, spreading or reflexed. Woods. Hampstead. Perennial. August.

XXV. Erigeron, Linn. Fleabane. Annual or perennial herbaceous plants, found in Europe, North America, and South Africa. Stem erect. Leaves simple, entire or toothed. Flowers paniculate or corymbose, rarely solitary. Involucre ovate-oblong. Bracts linear, erect, nearly equal, the innermost longest. Receptacle flat, naked, slightly punctured (cellular). Florets of the margin (ray) numerous, with an entire or slightly-toothed limb. Achenium obovate, angular (?). Pappus sessile, setaceous, in several rows. These plants are all more or less rigid and rough in their stem, leaves, and involucre bracts. Name from *ηρ*, *ver.* (early), and *γερων*, an old man.

1. **E. canadensis**, Linn. Canadian Fleabane. E. B. 2019, L. C. 640. Annual plants, with erect simple stems, branching only above, rough, rigid, leafy, flowering branches erect. Leaves lanceolate or linear entire, or slightly toothed (the lower leaves are often laxly toothed, the upper are entire). Heads small, cylindrical, *very numerous in lateral clusters, contiguous, forming a pyramidal panicle*. Involucre glabrous, or nearly so. Florets of the ray white or pale yellow, linear, notched, slightly longer than the central florets. Fruit with a whitish crest. Waste places and fields. Valley of the Thames, especially about Battersea and Chelsea, where it is a common garden weed. Annual. July—October.

A. 6. Alien.

Abundant on both sides of the Thames above Nine Elms and Pimlico. On waste ground about Ranelagh it is just as plentiful as Groundsel. Its handsome rosettes of radical leaves are now (October 26, 1857) dotting the dried mud and gravel in all directions.

2. **E. alpinus**, Linn. Alpine Fleabane. E. B. 464, L. C. 638. Stem erect, rigid, simple, hairy, leafy, usually *with a single head*. Root-leaves oblong-lanceolate or lanceolate-linear, tapering below into long foot-stalks. Stem-leaves lanceolate, sessile, all hairy. Involucre *hemispherical*, hairy or woolly. Florets of the margin numerous, light purple; those of the centre yellow, only about half as long as those of the disk. Seeds hairy. Highlands of Scotland. Perennial. July.

E. uniflorus, Sm. Stem always single-flowered. Involucre woolly. Breadalbane Mountains, Perthshire. Perennial. July.

A. 1, C. 3. Lat. 56°—57°. Alt. 800—900 yards. T. 38°—37°.

3. **E. acris**, Linn. Blue Fleabane. E. B. 1158, L. C. 639. Roots somewhat tufted. Stems erect or ascending, branching, reddish, downy. Leaves oblong-lanceolate or linear, entire or obscurely toothed; the lower leaves oblong-obtuse, the stem-leaves distant, sessile, usually pointed. Heads *solitary*, or rarely *two-three, terminating the branches*. Florets of the circumference violet, lilac, or rosy, slightly longer than the central florets. Crest pale or reddish. On chalk and gravel; sometimes on walls. Biennial or perennial (?). June—September. *A. Jc*

XXVI. **Chrysocoma**, Linn. Goldilocks (Golden-locks). Shrubs or herbaceous plants. Leaves numerous, simple, usually narrow. Flowers terminal, solitary, or corymbose. Involucre hemispherical. Bracts leaf-like, linear, convex, pointed, in one row. Receptacle flat, naked, slightly pitted (alveolate) or tuberculated. Florets all tubular, perfect, five-cleft. Fruit obovate, compressed, silky (?). Pappus sessile, copious, rough, in two rows. South Africa is the home of these species.

C. Linosyris, Linn. Flax-leaved Goldilocks. E. B. 2505, L. C. 620. Stems erect, round, furrowed, simple, leafy. Leaves scattered, linear, rough at the margins. Heads numerous, corymbose. Bracts linear, leaf-like, lax, the lower ones spreading or reflexed. Florets all tubular, equal, with linear-lanceolate segments. Fruit angular, hairy, crowned with a plume of rough fibres. Limestone maritime cliffs. Perennial. August, September.

A. 2, C. 3. Lat. 50°—54°. Alt. 0. T. 52°—49°.

XXVII. **Doronicum**, Linn. Leopard's-bane. Large, perennial, tuberous rooted plants. Stems upright, leafy. Leaves oblong or cordate, mostly toothed. Flowers terminal, large, early. Florets all yellow. Involucre hemispherical. Bracts in two rows, linear, nearly equal, and about as long as the ray-florets. Receptacle somewhat convex, naked, pitted. Florets of the ray female, in one row, about as many as the inner row of bracts, ligulate, three-five-toothed. Fruit obovate, downy, furrowed; that of the ray without down; that of the disk (centre) furnished with sessile setaceous down.

1. **D. plantagineum**, Linn. Plantain-leaved Leopard's-bane. E. B. 630, L. C. 654. Root creeping, rhizomes ending in fleshy bulbs. Stems erect, furrowed, downy, simple, or branching at the top. Leaves downy or hairy, sinuated, toothed, *the lower petioled*; petiole auricled, and stem clasping; upper leaves sessile. Fruit of the centre hairy, of the ray smooth, and without a crown. Naturalized. Perennial. June.

∟ A. 5. Alien.

2. **D. Pardalianches**, Linn. Spotted Leopard's-bane. E. B. 2654, L. C. 653. Root and stem as in the preceding species, only the stem of *D. Pardalianches* is more deeply furrowed and more branching. Root-leaves *on long petioles, cordate*. Stem-leaves sessile, clasping, with large auricles. Fruit as in *D. plantagineum*.

Both these species are reputed British, but we have never seen

at as Perth

Woods & plantations on the banks of Almond & Tay near Perth

them naturalized. They are perennial, and flower between April and July.

A. 10. Alien.

XXVIII. Cineraria, Linn. in part. Fleawort. Annual or perennial plants. Leaves simple, entire, toothed or sinuate. Heads in a terminal umbel-like corymb. Bracts equal, in one row, without scales at their base. Florets of the margin strap-shaped, female, in one row, with a plume. Florets of the centre perfect, tubular. Fruit nearly cylindrical, striated, with a crown of very fine, silky fibres, in several rows.

1. **C. campestris**, Retz. Mountain Fleawort. E. B. 152, L. C. 652. Root truncate, with many fibres. Stem erect, simple, somewhat hollow, woolly, or shaggy. Leaves densely cottony and white beneath, green above; the root-leaves slightly and unequally crenate, spatulate, or oblong, attenuated into petioles; stem-leaves sessile, lanceolate, or linear. Heads erect, bracteate at the base of the branches. Peduncles simple (in very exposed places it only bears a single head). Bracts of the involucre linear, downy, or quite glabrous. On chalky downs in the middle and south of England. Hogsback, near Puttenham. Perennial(?). June.

A. 5, C. 12. Lat. 50°—54°. Alt. 0—200 yards. T. 50°—48°.

Var. *β. maritima*. Whole plant much larger, with the lower leaves toothed, and with numerous larger heads. Holyhead. Rev. H. Davies, "Welsh Botanology," p. 79.

C. palustris, Linn. Marsh Fleawort. See *Senecio*.

XXIX. Senecio, Linn. Groundsel. Ragweed or Ragwort. Herbs or shrubs, chiefly natives of Europe and Africa. Stem erect, leafy. Leaves pinnatifid or undivided, serrated, smooth, or downy. Flowers yellow, corymbose. Involucre somewhat conical. Bracts numerous, equal, linear, contiguous, with a smaller number of unequal minute, imbricated bracts at the base of the inner row; these latter mostly with black tips. Receptacle slightly convex or flat, tessellated, naked. Fruit angular, with sessile, setaceous down (pappus), in several rows.

SECT. I.—Annuals. Florets all tubular, or the marginal ones short and revolute.

1. **S. vulgaris**, Linn. Groundsel. E. B. 747, L. C. 643. Root short, branching into many radical fibres. Stems erect or ascending, branching above, downy, hollow. Leaves rather fleshy, pinnatifid, lobes with pointed teeth. Heads small, numerous. Involucre cylindrical; lower bracts (scales) closely appressed, very short, often with a coloured (black) point. *Flat florets of the ray absent*. Fruit downy. Fields, gardens, rubbish. Annual. Flowers during nearly the whole year.

Var. Ray-florets elongated. On a sandy eminence covered with old Firs, near Churchill, Worcestershire.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—42°.

2. **S. sylvaticus**, Linn. Wild Groundsel. E. B. 748, L. C. 644. Stem erect, simple below, branching above, slightly downy, and glandular. Leaves pinnatifid, downy below; lobes distant, unequal, oblong-linear, toothed or sinuate, root-leaves and lower leaves of the stem petioled; upper leaves clasping, auricled. Heads small, numerous, in a large terminal corymb. Involucre cylindrical, tapering when in flower, cylindrical-conical in fruit. Outer bracts very short, with *uncoloured points*. Florets of the margin *minute, reflexed*, few. Fruit (achenia) cylindrical, constricted at both ends with hairy or downy ribs. Sandy fields and dry banks. Annual. July.

A. 18, C. 80. Lat. 50°—59°. Alt. 0—350 yards. T. 52°—43°.

3. **S. viscosus**, Linn. Clammy Groundsel. E. B. 32, L. C. 645. Root annual. Stems ascending, erect, branching, hairy, viscid, leafy, round, furrowed, or ridged. Leaves pinnatifid, with linear, entire, toothed, or lobed segments, broadly auricled at the base, with clammy, glandular hairs. Heads ovate, cylindrical, more or less numerous, in lax, terminal corymbs. Bracts of the involucre linear, lanceolate, herbaceous, with numerous glandular, viscid hairs, the lower ones lax and reflexed, not coloured at the tips. Florets of the margin *small, linear, reflexed*. Fruit smooth, black, or dark brown. Waste ground. Annual. July—September.

A. 14, C. 30. Lat. 51°—58°. Alt. 0—200 yards. T. 50°—47°.

SECT. II.—Perennials, except *S. squalidus*. Florets of the margin flat and spreading.

§ 1. Leaves divided (pinnatifid).

4. **S. squalidus**, Linn. Elegant Groundsel. E. B. 600, L. C. 646. Stem glabrous, slightly furrowed, branching. Leaves pinnatifid, glabrous, half-clasping, with small auricles; lobes *oblong, toothed*. Involucre cylindrical when in flower, glabrous; outer scales minute; all tipped, with black teeth. Ray-florets ribbed, notched or entire, horizontal or reflexed. Receptacle quite flat, pitted. Fruit cylindrical, striated. Walls, Oxford. Annual. July.

5. **S. cruceifolius**, Linn.; *tenuifolius*, Jacq., Sm. Hoary Ragwort, E. B. 574, L. C. 647. Root creeping, stems erect, rigid, branching above. Leaves pinnatifid, with oblong or linear, entire or toothed lobes, cottony, especially below, sometimes nearly smooth. Heads numerous, in terminal corymbs. Involucre ovate-cylindrical, downy; bracts oblong, acuminate, with *several lax secondary ones, about half as long as the inner bracts*. Fruit scabrous, downy; crown with many rows of fibres. Hedges, &c. Perennial. July, August.

This is the commonest species of *Senecio* in the eastern parts of the Isle of Wight.—A. I.

A. 13, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

6. **S. Jacobaea**, Linn. Ragweed, Ragwort. E. B. 1130, L. C. 648. Root short, truncate, vertical, or oblique. Stems erect, rigid, angular, furrowed, glabrous, or slightly downy, branching only above. Root-leaves petioled, oblong-toothed, or lyrate, sometimes in a rosette; stem-leaves *pinnatifid, with oblong-linear, toothed lobes*,

sessile, more or less auricled. Heads large, numerous. Involucres hemispherical, glabrous, or nearly so, with a few lanceolate, spreading bracts at the base. Fruit—plume of few fibres. Meadows, waysides, hedges, ditches. Perennial. July.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—700 yards. T. 52° — 40° .

7. **S. aquaticus**, Huds. Water Ragwort. E. B. 1131. L. C. 648*. Root short, truncate. Stems erect, rigid, branching above, often reddish. Leaves *lyrate-pinnatifid*, with a large, ovate or oblong, terminal lobe. Involucre hemispherical, with *obovate acuminate* bracts. Fruit downy or glabrous. Watery places. July—September.

Note.—The ray-florets of this species are fewer and broader than in *S. Jacobæa*. A variety of the former?

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—350 yards. T. 52° — 43° .

“Between Chatteris and Ely.”—Mr. Babington, in “Phytologist,” vol. ii., p. 303.

§ 2. Leaves entire.

8. **S. paludosus**, Linn. E. B. 650, L. C. 649. Stem tall, erect, grooved, stout, branching only above. Leaves *lanceolate, elongate*, finely toothed, sessile. Heads large, numerous, terminal. Involucre slightly downy, with linear bracts. Ray-florets ten-fifteen.

This plant has almost disappeared from our Flora. It still grows sparingly in the fens in the East of England, *vide* Wm. Marshall, F.L.S. (“Phytologist,” N. S., vol. ii., p. 250.) Perennial. July.

A. 2, C. 3. Lat. 52° — 54° . Alt. 0—50 yards. T. 49° — 48° .

9. **S. saracenicus**, Linn. Broad-leaved Ragwort. E. B. 2211, L. C. 650. Stems tall, erect, glabrous, with prominent angles. Leaves sessile, *ovate-lanceolate*, acuminate, finely and irregularly toothed, glaucous. Involucre cylindrical, downy; bracts linear, outer ones long, all tipped with black points. Florets of the margin few.

“Between Wells and Glastonbury, and near Shepton Mallet.” It was still growing in this locality in 1855, *vide* Ed. Burton, Esq., Brooklyn, near Maidstone, Kent, where it is partly naturalized. It also still grows about Ingleton, Yorkshire.

A. 10, C. 20. Lat. 51° — 56° . Alt. 0—200 yards. T. 50° — 47° .

10. **S. palustris**, D. C. *Cineraria palustris*, Linn. Marsh Fleabane. E. B. 151, L. C. 651. Stem a yard high, simple, branching above, stout, hollow, angular, leafy. Leaves lanceolate, wavy, variously toothed. Flowers numerous, erect, on shaggy stalks. Calyx hairy, cylindrical. Ray-florets numerous, spreading, short. Seeds smooth, furrowed, with long, white down.

Fen-ditches. Very rare. Sm., “Eng. Fl.,” vol. iii., p. 445. “Still in the Cambridgeshire fens,” *vide* Wm. Marshall, F.L.S. Perennial. July. (“Phytologist,” N. S., vol. ii., p. 250.)

A. 2, C. 4. Lat. 52° — 54° . Alt. 0—50 yards. T. 49° — 48° .

XXX. **Eupatorium**, Linn. Hemp-Agrimony. Herbs or shrubs, chiefly American. Stems erect, leafy. Leaves opposite, mostly simple, and strongly serrated or lobed. Flowers densely

corymbose. Involucre oblong. Bracts lanceolate, unequal, imbricated. Receptacle small, naked. Florets uniform, perfect, their tops forming a flat disk. Style prominent. Stigmas downy. Fruit oblong, angular. Pappus in one row, simple and rough, or feathery.

E. cannabinum, Linn. Hemp-Agrimony. E. B. 428, L. C. 619. Stems erect, simple or branching, round, downy or rough, leafy. Leaves petiolate, opposite, with three-five lanceolate, toothed segments or leaflets, the terminal leaflet largest, more or less petioled. Heads small, numerous, in a large flattish corymb. Florets all tubular, pink, about four or five in a head. Banks and shady places. Perennial. July.

A. 17, C. 75. Lat. 50°—59°. Alt. 0—200 yards. T. 52°—46°.

XXXI. **Tussilago**, Linn. in part. Colt's-foot. Perennial plants, with radical, simple, cordate-angular or lobed leaves, appearing after the flower. Flowers solitary on radical scapes. Involucre cylindrical. Bracts erect, close, linear, equal. Receptacle naked. Ray florets numerous, linear; disk-florets few, male only. Fruit obovate-oblong, glabrous, only produced by the ray-florets. Pappus very slender; that of the ray-florets in several rows; that of the disk in one row.

T. Farfara, Linn. Common Colt's-foot. E. B. 429, L. C. 637. Root rhizomatous, thick, fleshy, creeping. Stems erect, slender, scaly, cottony, one-flowered, four-six inches high, elongated after flowering. Leaves all radical, on long petioles, roundish, cordate, angular, lobed, sinuate, developed long after the flowers are decayed. On clayey soils. Perennial. March, April.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—850 yards. T. 52°—38°.

XXXII. **Petasites**, Tournf. *Tussilago*, Sm., Gært. Butterbur. Root thick, creeping, bearing the leaves long after the flower has disappeared. Stem simple, furnished with linear-lanceolate herbaceous or membranous scales, bearing a somewhat ovate-elongated cluster of shortly pedicelled heads of florets, which are imperfectly dioecious. Leaflets of the involucre in one or two rows, often with smaller scales at the base. Receptacle naked, deeply pitted. Perfect florets tubular, with a deeply five-cleft limb, and narrow acute segments. Female florets filiform, usually central, where female florets are predominant, or marginal where the reverse is the case. Fruit cylindrical, slightly striated, crowned with a greater or less number of rough hairs.

P. vulgaris, Desf. *Tussilago Petasites*, Sm. Common Butterbur. E. B. 430, 431, L. C. 636. Root fleshy, with creeping rhizomes. Stems short, thick, downy, with loose, narrow scales. Leaves roundish, angular, appearing after flowering, numerous, spreading, on long stalks, often attaining a great size (sometimes nearly a yard in diameter). Heads in an ovate-oblong cluster. Banks of rivers and moist meadows; not very common. Perennial. March, April.

A. 17, C. 75. Lat. 50°—58° (61°). Alt. 0—500 yds. (P) T. 51°—46° (42°).

This genus is distinguished from *Petasites* by the ligulate female florets and the smaller and neater leaves. Winter Heliotrope is frequently cultivated for the sweet odour of its flowers, and for the use of the bees. It is occasionally found almost naturalized. It may be known by its roundish, toothed leaves, which appear before the flower-stem. It flowers in winter.

"*Petasites fragrans*, *Nardosmia*, Cass. (the Sweet-scented Butterbur), a native, I believe, of southern Italy, in Calabria, upon mountains, is now quite naturalized on moist ditch banks, under hedges, near gardens, and in orchards, in very many parts of the island, it being a general favourite, from the delicate fragrance of its early flowers, which are produced in mild seasons as early as January or February. It is found all over the grounds at Swainston, where, Sir Richard Simeon assures me, it makes excellent shelter for pheasants; also at the foot of walls at Bembridge, and in the orchard and hedges adjoining, at East Cowes Castle."—Dr. Bromfield, in "*Flora Vect.*"

I have seen it growing wild in several parts of Surrey and Middlesex.—A. I.

SUB-ORDER II.—Ligulifloræ, End. Plants rarely spinous, often with milky juice. Receptacle not chaffy. Florets ligulate (strap-shaped), radiating. Style not enlarged above, with reflexed or coiled branches. Stigmatic lines not reaching to the middle of the branches. Crown of the fruit persistent, free, rarely united at the base, rarely none or a membranous rim.

TRIBE. I.—Fruit without a crown of silky hairs, either truncate or surmounted by a margin (rim), or a very short crown of silky-membranous scales.

Genera.—*Lapsana*, *Arnoseris*, *Cichorium*.

SYNOPSIS OF THE GENERA.

Lapsana. Fruit flattened, striated, with a crown or rim.

Arnoseris. Fruit nearly five-angular, with a short pentagonous rim.

Cichorium. Fruit compressed, quadrangular, with a membranous chaffy crown.

XXXIII. *Lapsana*, Vaill. Nipplewort. Annual, glabrous, more or less milky plants. Stems leafy. Lower leaves lyrate, upper toothed. Involucre with one row of erect bracts, and a few short ones at the base. Receptacle naked, flat, dotted. Florets uniform. Stamens with very short filaments. Ovary obovate, with sessile spreading stigmas. Fruit striated, compressed, without a beak, deciduous. Pappus none.

***L. communis*, Linn.** Nipplewort. E. B. 844, L. C. 590. Stems erect, more or less branching, almost glabrous above, hairy beneath. Lower leaves lyrate, with a large, angular-toothed, terminal lobe. Peduncles slender, each subtended by a small bract. Involucre angular, smooth. Flowers yellow. Waysides and culti-

vated places. Annual. June. This is one of the commonest wayside plants in Scotland. It is the only viatical species apparently common both in the south and north of the British Isles.

A. 18, C. 81. Lat. 50° — 60° . Alt. 0—400 yards. T. 52° — 43° .

Lapsana, Sp. (?) Stem round, furrowed, pulverulent, branching and leafy; branches opposite, similar to the stem. Leaves ovate, faintly and distantly serrated, slightly wrinkled above, with prominent nerves beneath, opposite, all except the very uppermost with longer or shorter footstalks. Flowers few, on hairy glandular pedicels. Involucres ovate-globular, slightly angular; bracts about five, strongly keeled and fleshy. Petals (ray-florets) *five, pure white*, very small, toothed or notched; disk-florets equal, yellow. Receptacle conical, pitted. Fruit ribbed, hairy, dark-brown. Scales of the involucre longer than the achenia. Near Kew, at the corner where the Mortlake Road branches off from the road to Richmond, August the 25th, 1856.

XXXIV. Arnoseris, Gært. Swine's-succory. Lamb's-cress, Ger. Annuals with radical scapes, bearing one-three flowers. Leaves radical, obovate-oblong, toothed. Peduncles enlarging above, fistulous. Bracts of involucre equal; keeled, ultimately hardened and converging, with a few small ones at the base. Receptacle flat, naked, pitted. Fruit angular, smooth, crowned with an elevated entire rim (margin).

A. pusilla, Gært. *Lapsana pusilla*, Willd. and Smith. Dwarf Nipplewort. Swine's-succory. E. B. 95, L. C. 589. Root tapering, with fibrous branches (rootlets). Stalks several, erect, leafless, enlarged above, quite smooth, reddish below, simple, branching above. Leaves all radical, in rosettes, depressed or ascending, oblong or obovate, toothed or lobed, tapering below, smooth or scarcely hairy except at the margin. Heads solitary on long, swollen, tubular peduncles, sometimes with several abortive heads. Involucre roundish when in fruit. Sandy and gravelly fields. Annual. June—September.

A. 7, C. 20. Lat. 50° — 58° . Alt. 0—200 yards. T. 51° — 47° .

Var. Stem very slender. Leaves spatulate, slightly toothed. Bexley Heath, Kent.

XXXV. Cichorium, Linn. Chicory. Milky, bitter, perennial or biennial plants, with fleshy roots. Stems upright, leafy. Leaves pinnatifid, toothed. Involucre cylindrical. Receptacle slightly chaffy. Bracts in two rows; outer bracts about five, short and lax; inner bracts eight or more, linear, converging, finally recurved. Florets spreading, deeply five-cleft or toothed. Anthers forming a five-angled tube. Ovary obovate, with a style as long as the stamens, and a revolute two-parted stigma. Fruit turbinate, crowned with two rows of short, bristly scales. The fleshy roots, upright, angular, leafy stems, and axillary, large, handsome, blue flowers sufficiently distinguish this genus.

C. Intybus, Linn. Common Chicory. E. B. 539, L. C. 591. Stems erect, stout, angular, downy, with spreading branches. Lower leaves runcinate, with angular, toothed lobes; upper ones lanceolate, sessile. Heads sessile on the branches, or on long or short pedicels. Lower bracts lax, lanceolate, pointed, leaf-like; upper ones (inner) oblong, with a narrow, scarious margin. Florets of the margin (ray) few, showy, bright blue. Borders of fields in chalky and sandy soils. Annual or biennial. July—September.

This plant has a very fibrous, tenacious bark, which might probably be useful for cordage, and in the paper manufactory. It is extensively cultivated for the sake of its roots, which are very commonly used as a substitute for coffee, or for its adulteration.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

Note.—The name *Endive* and *Intybus* are from the Arabic *Hendebeh*.

TRIBE II.—Fruit (at least in the centre) surmounted by a crown of feathery, silky fibres.

Genera.—*Hypochæris*, *Thrincia*, *Oporinia*, *Leontodon*, *Apargia*, *Picris*, *Helminthia*, *Tragopogon*, *Lactuca*, *Sonchus*, *Mulgedium*, *Börkhausia*, *Crepis*, *Hieracium*.

SYNOPSIS OF THE GENERA.

Hypochæris. Receptacle chaffy. Fruit beaked.

Thrincia. Receptacle naked. Fruit with a membranous toothed crown.

Oporinia. Fruit crowned with one series of feathery fibres.

Leontodon. Receptacle naked. Fruit crowned with rough fibres.

Apargia. Flowers terminal, solitary, on hairy radical peduncles.

Picris. Fruit crowned with hairs, united at the base.

Helminthia. Fruit crowned with feathery down.

Tragopogon. Involucre consisting of equal bracts in a single row.

Lactuca. Bracts of the involucre unequal, in several rows. Fruit beaked.

Sonchus. Fruit without a beak, crowned with fine fibres.

Mulgedium. Fruit with a ciliated disk.

Börkhausia. Fruit cylindrical, beaked. (See *Crepis*.)

Crepis. Fruit cylindrical, without a beak.

Hieracium. Fruit crowned by a slightly prominent rim.

XXXVI. Hypochæris, Linn. Cat's-ear. Swine's-cress, Ger. Stems branching, with several heads, or simple and one-headed by abortion. Leaves radical, or nearly so, runcinate or toothed. Flowers yellow. Bracts of involucre numerous, unequal, in several rows. Receptacle furnished with membranous scales. Fruit striated, more or less rough, attenuated into a long, slender beak. Crown of the fruit feathery or toothed, equal, persistent; fibres (pappus) of the margin not feathery, but simply toothed. Hollow, naked stems, with only radical leaves and large yellow flowers, characterize this genus.

1. **H. radicata**, Linn. Long-rooted Cat's-ear. E. B. 831, L. C.

553. Root thick, branching. Stem erect, usually branching, *glabrous, glaucous*, furnished with short, herbaceous, or scale-like bracts. Leaves radical in a rosette, oblong, narrowed at the base, runcinate or sinuate, usually very rough. Peduncles slightly swollen above (under the flowers). Leaflets of the involucre membranous at the margin. Fruit with a long tapering beak. Meadows, pastures, roadsides. Perennial. June.

A. 18, C. 81. Lat. 50° — 60° . Alt. 0—600 yards. T. 52° — 41° .

2. **H. maculata**, Linn. *Achyrophorus*, Scop. Spotted Cat's-ear. E. B. 225, L. C. 552. Root thick, often crowned by the bases of the decayed leaves. Stem erect, usually branched above, rarely simple, *rough, hairy, with one or two leaves*. Root-leaves in a rosette, oblong, sinuate-dentate, large, hispid, with one or two brown or black patches. Peduncles slightly enlarged above. Involucre shorter than the flowers, *invested with black hairs*; inner bracts downy at the margins. Achenia (fruit) terminating in a long beak. Chalky and limestone hills. On Flookburgh Rocks, by the sea near Cartmel, Lancashire.—John Windsor, M.D. (See "Phytologist," N. S., vol. ii., November, 1857). Perennial. July, August.

A. 2, C. 3. Lat. 52° — 54° . Alt. 0—100 yards. T. 49° — 48° .

3. **H. glabra**, Linn. Smooth Cat's-ear. E. B. 575, L. C. 551. Stems erect, branching, glabrous, each branch subtended by a leaf-like scale at its base, and bearing a single head. Leaves radical, in a rosette, oblong, sinuate, toothed or lobed, runcinate(?), glabrous. Bracts of the involucre glabrous, *the inner ones about as long as the florets*. Fruit of two sorts; the interior beaked, the exterior without a beak, or with a very short one. Sandy fields. Weybridge, Surrey. Annual. July—September.

A. 12, C. 25. Lat. 50° — 58° . Alt. 0—200 yards. T. 51° — 47° .

XXXVII. **Thrinicia**, Roth. *Leontodon*, Sm. Thrinicia. Stalks hairy, single-flowered. Leaves all radical, rarely undivided. Bracts of the nearly cylindrical involucre numerous, unequal, imbricated in several rows. Receptacle naked, smooth, punctured. Fruit slightly curved, rough, striated, attenuated above, marginal, surmounted by a membranous, toothed, very short crown; the central achenia crowned with a downy, feathery plume.

T. hirta, Roth. Rough Thrinicia. E. B. 555, L. C. 548. Root short, truncate, fibrous about the collar, or tapering and producing fibres through its whole extent. Stalks erect or ascending, round, slightly furrowed, very hairy at the base. Leaves long, sinuate, toothed, or runcinate, rarely undivided, more or less hispid. Heads erect, variable in size. Involucre partly glabrous; bracts strongly keeled. Gravelly pastures, and dry, stony places. Perennial(?). July.

Var. *a. vulgaris*. Root short, truncate. Involucre slightly hairy or glabrous.

Var. *b. hispida*. Root tapering. Heads larger than in var. *a*. Involucre hairy.

A. 15, C. 60. Lat. 50° — 56° . Alt. 0—200 yards. T. 52° — 47° .

XXXVIII. Oporinia, Don. *Leontodon*, Linn. Heads solitary. Leaves radical. Bracts of the involucre numerous, unequal, imbricated in several rows. Receptacle naked. Fruit striated, tapering at the summit, with a persistent crest of one row of fibres, by which last very slender mark it is chiefly distinguished from *Leontodon*.

O. autumnalis, Don. *Apargia autumnalis*, Sm. Autumnal Hawkbit. E. B. 830, L. C. 550. Root truncate or oblique, with several strong fleshy fibres. Stems erect or ascending, solitary or several, simple or branched, furrowed, hairy or nearly smooth, when branched with a single abortive leaf, sixteen-eighteen inches high. Leaves mostly radical, in rosettes, lanceolate or oblong, toothed or lobed, tapering at the base, usually rough. Heads solitary, cylindrical, on long peduncles, which are enlarged upwards and hollow at the base of the involucre; bracts unequal, lanceolate, keeled, glabrous or hairy. Fruit tapering at both ends, with brownish down. Meadows, pastures, &c. Perennial. August, September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1000 yards. T. 52°—37°.

Var. *β. Apargia taraxica*, Sm. Leaves quite smooth, oblong, on long, slender stalks, nearly entire or slightly toothed, or with one or two backward-pointing lobes. Stem quite simple. Involucral bracts hairy. Florets reddish below. On lofty mountains.

Var. *γ. sordidus*. Stem branched. Leaves and involucre hairy. A large plant. Scotland, in highland glens.

XXXIX. Leontodon, Sm. *Taraxacum*, Juss. Lion's-tooth. Perennial stemless plants, with runcinate (teeth or jags pointing backwards) rarely entire leaves. Heads terminal, solitary, on naked, fistular, usually very glabrous, radical peduncles. Flowers yellow. Bracts of the involucre numerous, unequal, in several rows, the outer ones usually spreading or reflexed, all reflected when the plant has reached maturity. Receptacle naked. Fruit longitudinally ribbed, with transverse *strise*, abruptly attenuated into a filiform beak. Aigrette or plume of several rows.

L. Taraxacum, Linn. *Dens-leonis*, Desf. Dandelion. E. B. 510, L. C. 588. Root thick, fleshy. Radical peduncles five-ten inches high, erect or ascending. Leaves all radical, in a rosette, oblong; lobes triangular, pointed, toothed or entire; the leaves are rarely entire or sinuate. Bracts of the involucre all reflected when the fruit is ripe, rarely all erect when in flower. The plumes in combination form a round head. Fruit with longitudinal ribs and *striae*, tubercular above (near the apex). Meadows, waysides, about houses and in gardens. Perennial. March—October.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards. T. 52°—39°.

Var. *α. officinale*. Stems tall, very glabrous. Leaves runcinate, with large triangular lobes. Fruit green, yellowish-brown. Meadows, gardens, &c. Very common. Perennial. April.

Var. *β. levigatum*. Half as tall as the above variety; leaves with

narrower lobes. Involucral bracts often glaucous, not reflexed. Fruit red or brick-dust colour. Dry sandy places.

Var. *γ. palustre*. Plant much smaller than either of the above varieties. Leaves almost entire, linear or oblong, attenuated below. Outer bracts erect. Fruit brown. Moist places.

XL. *Apargia*, Sm. (?) *Leontodon*, Linn. Hawkbit. Usually single-flowered plants, with radical, sinuated or toothed leaves. Involucre ovate, cylindrical. Bracts unequal, in several rows; inner linear, parallel, imbricated; outer very small, irregularly imbricated. Receptacle naked or slightly hairy, dotted. Fruit oblong, striated, slightly rough, tapering at the top, with sessile, feathery down, or the exterior down serrulated.

A. *hispid*a, Willd. Rough Hawkbit. E. B. 554, L. C. 549. Root oblique, truncate. Flower-stalks radical, erect, round, tapering, bearing *one head*, hairy. Leaves all radical, sinuate, pinnatifid or runcinate, hairy. Crown of the fruit in two rows, the outer row not feathery, only toothed. Meadows and pastures. Perennial. July.

A. 16, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

XLI. *Picris*, Linn. Ox-tongue. Herbaceous plants, indigenous both to Europe and Asia, with branching hispid stems, and alternate very rough leaves. Flowers terminal, solitary, yellow. Involucre sub-cylindrical. Bracts in two rows; inner equal, imbricate; outer lax, spreading. Receptacle flat, dotted; achenia uniform, striated across, attenuated into a short beak, or with the apex constricted. Pappus equal, in two rows, deciduous; inner feathery, outer setaceous.

P. *hieracioides*, Linn. Hieracium-leaved Ox-tongue. E. B. 196, L. C. 547. Stem erect, round, branching above, hispid, prickly. Leaves oblong or lanceolate, the lower sinuated and toothed, tapering at the base; the upper sessile or clasping. Involucre cylindrical-ovate; outer bracts lax, shorter than the inner ones; inner bracts lanceolate, convex and enlarged at the base, strongly fringed or covered with glandular bristles. Heads large, bright yellow. Chalky fields. Biennial. July.

A. 10, C. 40. Lat. 0°—55°. Alt. 50—200 yards. T. 51°—47°.

XLII. *Helminthia*, Juss. Worm-wort. Annual, very hispid plants, with erect stems, forked (dichotomous) branches, and alternate semi-amplexicaule leaves. Flowers terminal, solitary, yellow. Involucre half-clasping as in *Picris*. Bracts about eight, erect, connivent, subtended by five cordate, broad, spreading leaves. Receptacle flat, dotted. Achenia uniform, elliptical, transversely furrowed (?), rounded at the apex, and terminated by a long, slender, brittle beak. Pappus persistent in several rows, feathery.

H. *echioides*, Gært. Echium-like Ox-tongue. E. B. 972, L. C. 546. Stems stout, erect, branching, especially above, furnished with prickly hairs, which have tubercular bases. Leaves oblong, very rough,

with spinous hairs; the lower attenuated at the base, the upper cordate and clasping, ciliated, with prickly hairs. Outer bracts leaf-like, cordate, acuminate, fringed with spinous, simple hairs; inner bracts membranous at the edges, terminated by a long, fringed point. Involucre ovate. Ditches and banks, on clayey soil. Annual. July, August.

A. 12, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—47°.

XLIII. Tragopogon, Linn. Goat's-beard. Roots long, tapering, fleshy, with lateral fibres. Stems erect, rather succulent, simple or branching, leafy. Leaves linear, or linear-lanceolate. Heads terminal, solitary. Bracts of the involucre eight-twelve, herbaceous, equal, in one row, more or less united at the base. Receptacle naked. Fruit with longitudinal, rough, or toothed ridges, with a slender, long beak, crowned with a plume of several rows of interlaced fibres. Plants with smooth herbage, grass-like, sheathing, entire leaves, and solitary flowers, which shut up at twelve o'clock.

1. **T. pratensis**, Linn (?). *T. minor*, Fr. Meadow Goat's-beard. E. B. 434, L. C. 544. Root very long, vertical. Stem erect, simple or branched, very leafy, eighteen-thirty inches high (less on upland dry places). Leaves clasping at their base, channelled, keeled, broad where they form a sheath for the stem, branch, or flower, and furnished with long woolly hairs interiorly, abruptly tapering at the base or top of the sheath, long-tapering, and pointed upwards. Leaflets of the involucre longer than the yellow florets (twice as long as the florets). Outside of the tube of the florets furnished with dense yellow hairs or fringes. Meadows and marshes. Biennial. June—August.

There is a variety, rather unfrequent, with the involucral bracts not longer than the flowers. This is not uncommon in the Eastern Counties, and is probably Smith's *T. pratensis*. It is rare near London. (See "Phytologist," N. S., vol. i., pp. 153—5, 334).

A. 16, C. 60. Lat. 50°—59°. Alt. 0—200 yards. T. 51°—46°.

2. **T. porrifolius**, Linn. Salsafy. E. B. 638, L. C. 545. Stems erect, hollow. Leaves broad at the base, short, *gradually tapering*, not so thickly keeled as in the preceding. Peduncles swollen at the top, *as thick as the involucre*. Bracts in one row, equal, longer than the florets. *Florets purple*. Meadows by the Thames. Biennial. June.

An escape from cultivation? (See "Phytologist," N. S., vol. ii., p. 226.)

A. 6, C. 12. Lat. 50°—53°. Alt. 0—200 yards. T. 51°—48°.

XLIV. Lactuca, Linn. Lettuce. Milky, bitter, fetid plants, either annual or biennial. Stems erect, solid, round, leafy. Leaves simple, with a variable margin. Flowers in terminal panicles. Involucre cylindrical, few-flowered. Bracts flat, unequal, membranous at the edges. Receptacle small, naked, dotted. Florets numerous, with four-five teeth. Ovary obovate-oblong. Fruit obovate, furrowed,

compressed. Down (pappus) elevated on a stipe or beak nearly as long as the fruit.

1. **L. saligna**, Linn. Least Lettuce. E. B. 707, L. C. 556. Stems usually erect, round, *smooth*, branching, *slender*. Branches spreading or half-erect, slender or filiform, very smooth. Leaves sagitate, clasping, *linear*, tapering, pointed, very entire, smooth or rough only on the midrib; the lower leaves often runcinate. Heads small, oblong, mostly sessile on the branches, forming lax spikes. Florets yellow. Fruit oblong-obovate, glabrous, striated, with a long beak (twice as long as the fruit). Chalky and marly places. At the Butts, near Woolwich. Biennial. July.

A. 5, C. 10. Lat. 50°—59° (?). Alt. 0—100 yards. T. 51°—48°.

2. **L. virosa**, Linn. Acrid Lettuce. E. B. 1957, L. C. 554. Stems erect, leafy, more or less hollow, or with pith in the centre, *very prickly below*, smooth and branching above; branches slender, smooth, diverging. Leaves *obovate-oblong* or oblong, the lower petioled, the upper sessile and clasping, the midrib armed with strong prickles, the margin ciliated with spinous teeth. Heads small, numerous, peduncled or sessile, in a spreading panicle, with cordate bracts. Flowers yellow. Fruit *dark brown or black*, with a long white beak. All parts of the plant abound in an acrid, milky, viscid juice, with a strong, unpleasant smell. Dry banks. Biennial. July, August.

A. 12, C. 30. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

3. **L. Scariola**, Linn. Prickly Lettuce. E. B. 268, L. C. 555. Stem erect, flexuous or zigzag, tall, hollow, at least near the base, leafy, smooth, branching above; branches slender, spreading. Leaves smooth, with a spinous midrib, clasping, sinuate, dentate (*pinnatifid*) lobes, toothed above, entire below, *retroflexed* (directed backwards). Heads and florets as in *L. virosa*. Essex, not far from Benfleet. Mr. Salmon. Biennial. August.

A. 3, C. 6. Lat. 50°—54°. Alt. 0—50 yards. T. 51°—48°.

4. **L. muralis**, D.C. (Less. ?) Wall Lettuce. E. B. 457, L. C. 557. Stems erect, round, smooth, branching above. Leaves *lyrate, pinnatifid*, lobed or toothed, *with a large, triangular, toothed lobe*, glaucous beneath, light green above; upper leaves entire or toothed, linear, auricled, and clasping. Heads small, cylindrical on diverging, divaricated, compound panicles. Bracts *glabrous*. Fruit brown, with a beak. On damp walls, shady places, in woods. Annual. July.

A. 15, C. 50. Lat. 50°—58°. Alt. 0—350 yards. T. 52°—45°.

XLV. Sonchus, Linn. Sow-Thistle. Annual or perennial, milky, bitter plants. Stems usually tall, upright, hollow, leafy. Leaves more or less lobed, toothed or prickly at the edges. Inflorescence terminal, subumbellate. Involucre tumid at the base. Bracts imbricated in two rows, unequal, acute, finally connivent. Florets four-five-toothed. Fruit oblong, roughish, compressed, with sessile pappus.

1. **S. oleraceus**, Linn. Sow-Thistle. E. B. 843, L. C. 561. Stems erect, branching above, angular, slightly winged, hollow, gla-

brous, sometimes hairy above. Leaves runcinate or pinnatifid, *with large angular lobes or teeth*, spinous, with large *pointed* auricles at the base. Heads cylindrical before and during flowering, afterwards depressed, terminating abruptly in a conical blunt point. Involucre *glabrous*, usually with a *few glandulous hairs*. Bracts succulent at the base. Fruit *striated across*. Fields and rubbish. Annual. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

Var. *runcinatus*. Leaves runcinate, terminal division large, triangular.

Sub-var. *triangularis*. Leaves reduced to a large, terminal, triangular lobe, the lobes absent or very small.

Var. *β. lacerus*. Leaves deeply pinnatifid; the terminal division slightly developed, usually more or less lobed.

Sub-var. *glandulosus*. Peduncles and involucre more or less glandulous.

2. **S. asper**, Hoffm. Rough Sow-Thistle. E. B. 2765, 2766, L. C. 560. Auricles of leaves *rounded*; fruit with *longitudinal ribs*.

Mr. Watson says that this grows intermingled with the above form.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—45°.

3. **S. arvensis**, Linn. Field Sow-Thistle. E. B. 674, L. C. 559. Stems erect, simple, very glabrous, hairy and glandular above. Lower leaves petioled; stem-leaves sessile, clasping, with *rounded auricles*, runcinate-pinnatifid, with an elongated, oblong, terminal lobe. Heads in an irregular, terminal corymb. The involucre covered with black, glandular, viscid hairs. Fruit striated across. Fields. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—100 yards. T. 52°—45°.

Sub-var. *integrifolius*. Leaves entire, or slightly sinuated. Heads nearly or quite solitary. In fields and meadows. Perennial. July—September.

Sub-var. *elatior*. Leaves divided, large, with broad auricles. Heads numerous. Wet or marshy places. This may be mistaken for the next.

4. **S. palustris**, Linn. Marsh Sow-Thistle. E. B. 935, L. C. 558. Stem simple, branching only near the summit. Angular and winged, quite smooth, only somewhat scabrous towards the top, leafy. Leaves linear lanceolate, serrated, the lower *with long, lanceolate, acute, runcinate lobes*, of which there are one or two pairs on the lower, and only the basal lobes or auricles on the upper leaves; the basal lobes are *lanceolate and pointed*, like the lateral lobes, but narrower; all the lobes, both basal and lateral, are parallel to each other; the upper leaves are *quite simple linear and sharply serrated*. Peduncles, pedicels, and involucre bracts are glandular and hairy. In the river Medway, between Aylesford station and the village.—W. P. and A. I., Sept. 5, 1857. As this is the first time this plant has been observed during the last twenty-five years, the time of its discovery is precisely entered. It was observed in the Medway, opposite Halling, in 1831, when the observer did not know that it was one of the very rarest of British

plants. Some time previously to the last date, it was collected by Mr. J. Woods and Mr. Kippist, in Deptford Marshes. A specimen existed in the late Mr. Luxford's herbarium. Mr. J. S. Mill informed me that Mr. Luxford and himself both sought for it in marshes between Blackwall and Ham, where the former had found it, but without success. Mr. Luxford's specimen was probably procured within the last twenty years. From these dates to this no trustworthy record of its appearance near London has been published.

A. 2, C. 6. Lat. 50° — 53° . Alt. 0—50 yards. T. 50° — 48° .

XLVI. *Mulgedium*, Cass. Alpine Sow-Thistle. Alpine plants, found only in the northern hemisphere. Leaves entire or runcinate. Flowers corymbose, blue. Involucre cylindrical. Bracts in two rows, inner equal and imbricate, outer lax and short. Receptacle without chaff or bristles, pitted (alveolate). Achenia uniform, with a short beak, and with a ciliated disk. Pappus setaceous, equal, in several series, attached to the very short beak of the seed.

***M. alpinum*, Less.** *Sonchus cœruleus*, Sm. Alpine Sow-Thistle. E. B. 2425, L. C. 562. Root woody, slightly creeping. Stem erect, glabrous below, hairy, glandular, viscid above, leafy, a yard high. Leaves lyrate, arrow-shaped at the base, clasping, with a long winged midrib, one pair of intermediate and one large triangular terminal lobe, all more or less toothed, smooth on both sides and slightly glaucous beneath. Flowers large, numerous, blue. A very handsome plant. Lochnagar, Aberdeenshire, and the Clova Mountains, Forfarshire. Perennial. July, August.

A. 1, C. 2. Lat. 56° — 57° . Alt. 700—950 yards. T. 40° — 37° .

XLVII. *Crepis*, Linn. Hawk's-beard. Annual, biennial, or perennial plants. Stems upright, branching, angular, furrowed. Involucre double, outer bracts short, lax, deciduous; inner ones linear, permanent, and converging. Receptacle without scales, with a few bristly hairs. Florets five-toothed. Fruit nearly cylindrical, striated, slightly attenuated above. Down simple, radiating, either sessile or stipitate, in several rows.

SECT. I.—Fruit with a more or less prominent beak.

1. ***C. foetida* (?)**, Linn. *Börkhausia foetida*, D. C. Stinking Hawk's-beard. E. B. 406, L. C. 585. Stem erect, with upright branches, hairy, hairs slender. Root-leaves large, runcinate, hairy on the midrib and nerves; stem-leaves rather small, linear, lanceolate, pointed, hairy on the keel and margin, clasping, enlarged and pinnatifid at the base; lobes linear, lanceolate, pointed. Lower bracts of the involucre spreading, hairy on the keels, nearly as long as the pappus. Dry chalky places. Rare. Biennial. June, July.

A. 3, C. 6. Lat. 50° — 53° . Alt. 0—50 yards. T. 51° — 48° .

Note.—This species differs from *C. setosa* in the more appressed and not ciliated lower bracts.

2. ***C. taraxacifolia***, Thuil. *Börkhausia*, D. C. Leontodon-

leaved *Crepis*. E. B. 2929, L. C. 586. Stems erect, often several from one root, simple at the base, branched above, more or less red on the under part, downy, hairy, or bristly. Leaves rough, hairy; the root-leaves in a rosette, narrowing below, runcinate, toothed, or pinnatifid; lobes unequal, entire or toothed; stem leaves sessile, clasping, deeply pinnatifid, lobes entire, finely ciliated, with a linear lanceolate, entire or toothed, terminal one. Peduncles not enlarged above, with one or two bracts. Bracts of the involucre ciliated on the keels; inner bracts with black glandular hairs. Florets of the ray-reddish externally. Fruit *with a long beak*. Meadows, pastures. Biennial. June, July.

A. 4, C. 8. Lat. 51°—53°. Alt. 0—100 yards. T. 50°—48°.

Note.—The root-leaves in this species are not so large as in *C. biennis*, and are more equally pinnatifid; the lobes are all broader and shorter; the stem-leaves are more divided, with a broad and not lanceolate lobe; the bracts are also more abruptly pointed and downy rather than hairy in some forms. The beaked fruit is the most constant mark.

3. *C. setosa* (?), Hall. *Börkhausia*, D. C. Stem erect, with upright branches, rigidly, hairy, channelled; hairs enlarged at the base. Leaves dentate or lobed, runcinate, clasping, with toothed, acute, elongated lobes at the base; upper leaves hastate, nearly entire. Lower bracts of the involucre spreading, bluntly keeled, *ciliated with stiff spreading hairs both on the margin and keel*, rather longer than the pappus. Cleygate, Surrey, among clover. Annual. July.

Naturalized?

SECT. II.—Fruit nearly cylindrical, but slightly attenuated above.

4. *C. biennis*, Linn. Biennial *Crepis*. E. B. 149 (?), L. C. 564. Root fusiform, fleshy, with numerous stout fibres. Stem angular, furrowed, sometimes very rough and bristly, sometimes quite smooth. Branching. Root-leaves in a rosette, not always decayed before flowering, runcinate-pinnatifid. Stem and upper leaves clasping, toothed, or pinnatifid, uppermost linear, nearly entire. Outer bracts of the involucre spreading, irregular, usually with blackened tips. Flowers large. Receptacle pitted, smooth, and shining. Fruit (achenium) smooth, beautifully marked, cylindrical-angular, *scarcely attenuated upwards*, nearly as long as the pappus. Chalky banks. Biennial. July, August.

A. 6, C. 10. Lat. 51°—56°. Alt. 0—100 yards. T. 49°—47°.

Note.—This is the common character of the species as seen in the examples collected near Northfleet, Kent. The name *Taraxacum-leaved Crepis* would be more appropriately given to this than to species No. 2. In *Crepis biennis* the lobes are much longer and more acute than in *C. taraxacifolia*. The corymb is much more spreading, the flowers on longer peduncles, and much larger than in the species with which it has been confounded. Some botanists separate *C. fœtida*, *C. taraxacifolia*, and *C. setosa* from *Crepis* on account of a slight difference in the fruit; while some eminent botanists

have been unable to distinguish No. 2 from No. 4, even as species.

5. **C. paludosa**, Mœnch. *Hieracium paludosum*, Sm. Marsh Crepis. E. B. 1094, L. C. 567. Stems erect, simple, angular, quite smooth, tapering, leafy, two-three feet high. Leaves large, *smooth*; *root-leaves runcinate at the base*, ovate-oblong, toothed above; stem-leaves clasping, cordate, with rounded, strongly toothed lobes, pale green below, deeper green above, with whitish patches, tapering. Bracts much attenuated, glandular, hairy, outer ones short. Fruit striated, not attenuated above, crowned with a single row of rigid fibres. Stainforth Wood, near Settle. Perennial. July, August.

A. 13, C. 40. Lat. 51°—58°. Alt. 50—650 yards. T. 47°—40°.

6. **C. succisæfolia**, Tausch. *Hieracium molle*, Sm. Scabious-leaved Crepis. E. B. 2210, L. C. 566. Stems erect, slender, simple, angular, slightly hairy. Root-leaves on very long stalks, *oblong, tapering below*, toothed, smooth, or nearly so; stem-leaves clasping, auricled, narrow below, toothed and slightly hairy. Lower bracts short, appressed; inner ones lanceolate, pointed, all slightly hairy. Flowers not large, corymbose. Fruit striated, tapering above. Moist woods, in the north of England and Scotland.

A. 5, C. 8. Lat. 54°—57°. Alt. (?) T. 45°—41°.

7. **C. virens**, Linn.; *tectorum*, Sm. Smooth Crepis. E. B. 1111, L. C. 563. Stems erect, simple, and branching above, or branching from the base, glabrous or downy, often hairy below, and sometimes rough above. Root-leaves *in a rosette*, often decaying at flowering time, *nearly glabrous*, midrib hairy, runcinate-pinnatifid, lobed or toothed; upper leaves enlarged and incised at the base, *linear-lanceolate*. Involucre hairy, hairs often black; outer bracts lax, pointed; inner equal, linear. Fruit oblong, linear, with conspicuous striæ, smooth. Fields. Annual. July. Very variable in the shape of its leaves and in hairiness of habit.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—350 yards. T. 52°—44°.

Var. Florets tubular.

XLVIII. Hieracium, Linn. Hawkweed. Perennial plants, on dry, hilly, mountainous, or woody places, and flowering rather late in the summer. Stems erect, leafy (in many species), and usually branched. Leaves hairy or rough. Whole herbage more or less bitter. Involucre imbricated, with numerous linear bracts, which are of unequal length. Receptacle convex, dotted, sometimes slightly scaly. Florets of the usual form. Stamens shorter than the florets. Ovary ovate; style and stigma as usual in this order. Fruit angular, furrowed, crowned with copious, uniform, sessile fibres. These species may generally be known by their upright, round, panicled stems; a few of them have single flowers on radical scapes.

SECT. I.—*Piloselloidea*. Monocephalous (one-headed). Stoloniferous (bearing radical shoots). Peduncles radical (flowers on leafless stems).

1. **H. Pilosella**, Linn. Mouse-ear Hawkweed. E. B. 1093,

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black bristles, interspersed with white ones. Florets of the ray erect, with equal teeth. Receptacle depressed. Fruit smooth. Down rather shorter than the bracts. Near Rydal, Westmoreland.—Hudson. It is a Swedish and North-European species, which *may* have been found in England, and may again be discovered.

Note.—The Nos. in this genus are the same as in the "London Catalogue," 5th edition.

2. **H. aurantiacum**, Linn. Orange-flowered Hawkweed. E. B. 1469, L. C. 569. Stems erect, round, *invested with black hairs*, which swell at their base, *mostly leafless*. Root-leaves oblong, entire, pointed, on short winged petioles (tapering at the base into petioles); surface rough, with glandular tubercles (the swollen bases of the hairs). Flowers *deep orange, in a dense corymb*. Bracts herbaceous, with many long, spreading, black hairs, interspersed with glands and scarious margins. Down of the fruit about as long as the conical involucre. Naturalized (?). Common in gardens. Perennial. July—October. Spontaneous on a lawn, at the cottage *ornée* in the Vale of Glen Lochay, about a couple of miles from Killin. In Wilton Woods, Cleveland.—J. G. Baker.

SECT. II.—*Pulmonarea*. Stems leafy (forming rosettes of leaves at the base), not stoloniferous. Root-leaves not decayed at the time of flowering. Fruit short, truncate.

§ 1. *Alpinæ*.

3. **H. alpinum**, Back. and Linn. (?) Alpine Single-flowered Hawkweed. Fl. Dan. 27, L. C. No. 3 (Sp. *Backhousianæ*). Stem erect, wiry, simple, never branched, rigid, hairy, with spreading, white hairs, and a single stem-leaf. Root-leaves oblong, elliptical, or oblong-lanceolate, pointed, slightly toothed, tapering below into long, winged, woolly petioles. Bracts of the involucre herbaceous, unequal, short, broad, narrowed above, densely covered with long, whitish hairs and

black bristles. Florets large, five-toothed, *teeth tapering* (?). Alpine places. Perennial. July.

Alt. 1000—1400 yards.

Note.—*H. Halleri* of E. B. 2379 is supposed to represent a very luxuriant form of *H. alpinum*.

4. *H. holosericeum*, Backhouse, pp. 19, 20,* E. B. 1110, is distinguished from the above by its blunt, entire leaves, more silky stem and involucre, and by its linear, attenuated, acute, inner involucre bracts.

Alt. 700—1200 yards.

5. *H. eximium*, Back. pp. 20, 21. *H. melanocephalum*, Hook and Ar., 7th ed. *H. villosum*, E. B. 2379. Stem elongated, six-fifteen inches high, densely clothed with black-based shaggy hairs and setæ (bristles), with one, rarely two-four heads. Root-leaves lanceolate or linear-lanceolate, acute, with sharp teeth, which point forwards; stem-leaves one-three, like the root-leaves, or like bracts. Bracts of the involucre linear, narrow, acute, very shaggy. In alpine places. Perennial. July, August.

Alt. 700—1000 yards.

6. *H. calenduliflorum*, Back. p. 23. Stem simple or branched, six-fourteen inches high, with large, handsome heads. Root-leaves broadly ovate or ovate-spathulate; stem-leaves acute, often bract-like. Bracts of the involucre like those of *H. eximium*, of which it may be only a variety, with somewhat broader root-leaves.

Alt. 1000—1400 yards.

§ 2. *Nigrescentes*.

7. *H. gracilentum*, Back. p. 24, Fl. Dan. 27, differs from the above in its shorter, hairier, rather stouter stem, with a somewhat broader stem-leaf. The flowers are rather larger, and the involucre is shaggier. (Not so shaggy in my specimens; the hairs are shorter and not so numerous.—A. I.) Mountains of Braemar. Perennial. July, August.

Alt. 800—1400 yards.

8. *H. globosum*, Back. p. 26. Stem six-twelve inches, with one or few heads, slightly hairy. Root-leaves broadly ovate, or ovate-lanceolate, entire, or slightly toothed. Buds spherical. Bracts numerous, linear, attenuated, nearly destitute of down and setæ (bristles). Rocks, Braemar. Perennial. July, August.

Alt. 800—1400 yards.

9. *H. nigrescens*, Willd. E. B., *H. pulmonarium*, 2307 (?). Willd., Hort. Berol. 10. Stems simple, erect, with long, spreading, white hairs, which are enlarged and black at the base. Root-leaves of various shapes, petioled, toothed, tapering at both ends, teeth various, with long, white, spreading hairs, intermingled with thick, black bristles. Stem-leaf lanceolate, rudimentary (a bract-like leaf). Bracts of the

* In the description of the *Hieracia*, p., with a number, refers to Backhouse's Monograph of the "British Hieracia;" and the altitudinal range is taken from the same.

involucre long, linear, attenuated above, pointed, herbaceous, thickly clothed with long white hairs, interspersed with numerous black bristles. Florets large, deeply five-cleft, with linear teeth (laciniae), hairy externally. Fruit clear, shining, brown, with five prominent angles, and with as many indistinct intermediate ones. Down of the fruit soft, not so long as the bracts. Alpine rocks, on the Grampians.

Hierac. negrescens Willd. x
looks like *maculatum*. Sm.

S. B. 2082

One of my *Hieracea* is very like
Haller's of S. B. 2379
a luxuriant state of *H. alpinum*
S. B. no 82

In S. B. the figs. 2083 & 2378
purporting to represent *H. Lawsoni* &
H. cerinthoides apparently repre-
sent the same plant. 2083 is rather
more glandular than 2378. The leaves
appear to correspond.

petioles. Stem-leaves lanceolate or oblong-lanceolate, elongate, tapering and pointed, rounded, and half-clasping at the base, smooth above, rough below, with shaggy margins. Heads large, solitary, on rather long, bracteate, glandular, hairy pedicels. Bracts of the involucre unequal, taper-pointed, convexly keeled, covered with black bristles and long shaggy hairs, deep green. Florets of the margin hairy externally, furrowed, with long, equal teeth. Teeth, near Kilmahog. Perennial. July 4th.

Alt. 500—700 yards.

Note.—The above description probably comprehends *H. Lawsoni*, or *H. anglicum*, with its varieties. Of *H. cerinthoides* I have not yet seen a wild specimen. (E. B. 2378.)

Note.—The figures 2083 E. B. and 2378 apparently represent the same plant. Fig. 2083 is rather more glandular than 2378. The leaves in both are pretty much the same.

14. *H. iricum*, Fries. *Lapeyrousii*? Froel. E. B. 2915 (2916?). Root fleshy, with numerous fibres. Stem erect, or nearly so, branched, hollow, round, hairy, shaggy, and leafy, with barren shoots. Root-leaves ovate, rounded, on tapering stalks; stem-leaves oblong, tapering at both ends, rather rigid, with a few small teeth; upper leaves ovate at the base, lanceolate, quite sessile, and clasping. Involucres ovate at the base, hairy, and shaggy, with stellate pubescence; outer scales lax, inner lanceolate, tapering, *not membranous at the margin*. Florets very large, bright yellow. A very conspicuous and highly ornamental plant. With the former, at Kilmahog. Perennial. July.

Note.—This plant approaches the section *Accipitrinæ*, in its rigid, erect, leafy stem, and broad bracts.

A. 8, C. 15. Lat. 54°—59°. Alt. 0—900 yards. T. 46°—38°.

15. *H. amplexicaule*, Linn. E. B. 2690. Stems erect, rigid, variable in height, furnished with dense, glandular, viscid hairs, leafy, branching above. Radical leaves obovate-oblong or oblong-lanceolate, tapering below, coarsely toothed, blunt; stem-leaves ovate-oblong, cordate at the base, and clasping; the upper ones subtending the branches, toothed, and more or less acute, all furnished with glandular hairs, and more or less viscid; uppermost leaves cordate, acuminate, entire. Heads large, or moderately so, on densely glanduliferous peduncles. Involucre ovate-cylindrical, bracts unequal, herbaceous, green, with scattered, glandular, black hairs and bristles, and rounded keels. Marginal florets narrow, furrowed, unequally toothed, hairy externally. Fruit small, tawny, shorter than the whitish down. Scotland, Clova Mountains (?) and Cleish Castle. Perennial. July—September. Alien.

A. 2, C. 2. Lat. 51°—57°.

§ 3. *Pallidæ*.

16. *H. pallidum*, Fries. Back. p. 43. Stem simple, or branching above, about one-two feet high, more or less hairy, sometimes with one-two leaves. Root-leaves in a dense rosette, *ovate-lanceolate*, acute, toothed chiefly at the base, stiffly ciliate, more or less hairy. Outer

leaves ovate, inner ones lanceolate. Stem-leaves lanceolate, sessile (shortly stalked), distant from the base. Heads few, spreading, ovate at the base, and often woolly. Bracts acute, pointed (cuspidate), with glandular bristles mixed with white flocky hairs. Marginal florets subciliate. Fruit compressed, pale, striated, short, crowned with short, rough fibres. Giggleswick and Penyghent, near Settle, Yorkshire. Perennial. July—September.

Alt. 300—700 yards.

16*. **H. lasiophyllum**, Back. p. 45. Stems leafless, or with one leaf, eight-twenty inches high, and with two or three heads of medium size. Root-leaves broad, rounded at both ends, rough, with coarse hairs, on bulbous bases. Involucres roundish. Bracts attenuated upwards. Braemar and Clova Mountains, and Craig Breidden, Wales. Perennial. July, August.

Alt. 300—900 yards.

17. **H. Gibsoni**, Back. p. 47. *H. hypochaeroides*, S. Gibson, in "Phytologist," vol. i., p. 907. Stems *leafless*, wiry, about a foot high. Leaves all radical, *broadly ovate, blunt*, apiculate, toothed and glabrous above, hairy at the margins. Involucres truncate at the base. Bracts broad, obtuse. Giggleswick Scars, and Gordale, near Malham, Yorkshire. Perennial. July—September.

18. **H. argenteum**, Back. p. 49. Stem simple or branched, one-two feet high, nearly glabrous, fistular. Root-leaves lanceolate, acute, toothed toward the middle, three-four inches long, with short, slightly hairy petioles; stem-leaves lanceolate or linear-lanceolate. Involucres constricted above. Bracts obtuse, with pale margins, and scattered, whitish hairs. Mountains of Clova and Braemar. Snowdon, Wales. Perennial. July, August.

19. **H. nitidum**, Back. p. 50. Stems glabrous, leafless, or with one leaf, fifteen-twentyfour inches high. Root-leaves lanceolate, sharply toothed, *almost runcinate*, glabrous above, slightly hairy at the margins, firm, deep green. Heads few. Involucres ventricose (turgid), with black hairs and setæ. Bracts acuminate or bluntish. Mountains of Braemar. Perennial. July, August.

Alt. 500—700 yards.

20. **H. aggregatum**, Back. p. 52. Stems fifteen-twenty inches high, with one leaf and numerous small heads, glabrous or flocky. Root-leaves in a dense rosette, broadly ovate, blunt, coarsely toothed at the base. Heads numerous, on elongate, slender peduncles. Involucres cylindrical in bud, *conical* after flowering, *flocky, with coarse down*. Bracts blunt. Mountains of Braemar. Perennial. July, August.

Alt. 500—900 yards.

21. **H. murorum**, Linn. Mural Hawkweed. E. B. 2082. Stem erect, slender (?), with a few long hairs and *one small leaf*, branching at the very top. Root-leaves several, in a rosette, persistent, ovate, *slightly tapering at the base*, acuminate or rounded at the end, pointed, hairy below, spotted above; teeth lax, spreading, lower ones horizontal, petioles concave, slightly winged. Heads ovate-roundish,

on densely hairy pedicels, bracts unequal, densely clothed with white hairs, and several black setæ intermixed. In rocky places. Perennial. June—August.

A. 18, C. 70. Lat. 50°—61°. Alt. 0—850 yards. T. 50°—38°.

22. *H. caesium*, Fries. Stem erect, rough, with a few long, straggling hairs, striated, with one or two leaves, *often leafless*, usually quite simple, in luxuriant forms branched. Radical leaves ovate or lanceolate, rounded, or tapering at the base—(In most examples I find the leaves truncate or even cordate at the base.—A. I.)—(both forms occur in the same individual), more or less toothed, downy on both sides, shaggy at the margin, and especially at the midrib, base, and petiole. Heads ovate-cylindrical, solitary, on downy, bristly-glandular pedicels. Bracts of the involucre unequal, convex, downy, chiefly glandular, bristly, on the rounded keel, green. Ray florets not hairy (?), sulcate. Fruit large, cylindrical, ridged or striated, brown, crowned with pale yellowish fibres, which are rather longer than the fruit. In dry places the leaves are often spotted. Giggleswick, near Settle.—A. I. Perennial. August.

23. *H. stelligerum*, Fries. Back. p. 59. Stems eighteen-twentyfour inches high, flocky, with one or two leaves and two or three heads, or branched, and with five-seven heads. Root-leaves ovate, blunt, or only slightly pointed, toothed, *hoary on both sides, with minute stellate down*. Stem-leaves large, similar to the root-leaves, *half-clasping*. Heads few. Involucres ovate at the base, clothed with hairs and setæ. Bracts slightly pointed.

Note.—Flocky throughout, and more robust than *H. caesium*, with a taller, less rigid stem, much larger and soft root-leaves and half-clasping stem-leaves. Banks of alpine streamlets. Perennial. July, August.

Alt. 500—1000 yards.

24. *H. vulgatum*, Fries.; *maculatum*, Sm. Spotted-leaved Hawkweed. E. B. 2121. Root strongly fibrous, with a thick crown. Stem erect, hairy or bristly. Hairs or bristles white, interspersed with stellate pubescence, branching, *scarcely leafy* (the stem-leaves are not numerous, as in the following section). Root-leaves in a rosette, oblong, pointed at the apex and tapering below into broad, flat, very hairy petioles, spotted, or rather flecked with purplish patches, hairy and downy; stem-leaves *oblong-lanceolate*, both root and stem-leaves toothed; teeth large, moderately spreading. Bracts of the involucre unequal, linear-lanceolate, with white stellate pubescence only (there is usually some setæ). Fruit shining, smooth, of a beautiful purplish black, strongly ribbed and cylindrical, with a yellowish white fibrous crown, which is considerably longer than the fruit. Found, with other Hawkweeds, from the sea-level to alpine heights. Perennial. July, August.

A. 18, C. 80. Lat. 50°—59°. Alt. 0—1100 yards. T. 50°—36° (?).

Var. *H. vulgatum* (?), Fries. *H. sylvaticum* (?) Sm. Common Hawkweed. E. B. 2031. Stems erect, simple, branching above, hairy, more or less leafy. Leaves rough on both sides, with large, erect teeth, lanceolate, tapering at both ends, the lower ones petioled,

the upper one sessile; barren leafy tufts present with the flowering stems. Peduncles hairy, with several *black bristles intermixed*. Bracts keeled, unequal, armed with black bristles. Marginal florets hairy, externally, half way above the bracts. Fruit brown, tapering at the base, furrowed, shining. On dry banks. Perennial. July.

§ 4. *Pseudo-accipitrinæ*.

25. **H. gothicum**. Stem erect, rigid, tapering, furrowed, hairy, leafy. Leaves elliptical-lanceolate or oblong-elliptical, the lower ones tapering at both ends, the upper rounded at the base; teeth sharp, with a rather upward direction, all smooth above and downy-hairy below. Heads large, few, solitary, on rather densely downy, slightly bristly pedicels. Bracts of the involucre flattish, blunt, with pale green or whitish margins, and black in the centre, downy, with a few black bristles. Fruit dark brown, shining, crowned with long, rough, brownish down. Cader-Idris and Snowden. Twycross, Leicestershire.—Rev. A. Bloxam. Mr. Backhouse states its habitat to be heathy or grassy places in subalpine districts. There are no such districts in Surrey and Leicester, whence this species is reported. I have examples from both these counties.—A. I. Perennial. July—September.

H. dovrense, Fries. Stem straight, rigid, leafy, hollow. Radical leaves few, decaying before the plant flowers, oblong or lanceolate, toothed, petiolate; stem-leaves sessile, half-clasping, cordate or ovate at the base. Heads roundish, contiguous, on one- rarely two-flowered peduncles. Bracts of the involucre broad, blunt, with black hairs (setæ?). Marginal florets ciliate. Fruit short, with white down.

Supposed to have been found in the Braemar district. Mr. Backhouse says—"I have examined (searched) the banks of the Clunie carefully, but find no traces of *H. dovrense*. It requires further search, and may probably yet be found." (Monograph, p. 66.)

SECT. III.—*Accipitrina*. Radical leaves either absent or decayed before the plant flowers. Bracts in many rows. Pappus (crown of the fruit) rigid, unequal.

§ 1. *Pseudo-pulmonariæ*. Stem leafy, occasionally with small rosettes at the base. Stem-leaves never clasping.

26. **H. tridentatum**, Fries. Tridentate-leaved Hawkweed. Back. p. 68. Stem slender, erect, branched only at the top, hairy and rough, with long white hairs and rigid bristles, leafy. Root-leaves permanent, few, ovate-lanceolate, acute, tapering at the base, with several minute spreading teeth. Stem-leaves similar, but smaller, and with fewer teeth (the teeth are near the centre of the leaf, and there are more than three teeth on the lower and fewer on the upper leaves), all petioled and hairy on both sides, petioles covered with long white hairs. Heads small, few, solitary, on long hairy peduncles. Bracts equal, with white hairs, and rows of black setæ on their keels, narrow, attenuated, rather unequal, not so numerous as in *H. boreale*. Fruit deep brown or black, shining, slender, ribbed,

crowned with short, rough fibres. Stainforth, near Settle, Yorkshire. Perennial. September.

Distinguished from *H. vulgatum* by its taller, more leafy stem, the hairy base of its leaf-stalks or of the leaf (when sessile), and by the usually large sharp teeth towards the middle of the leaves.

A. 15, C. 50. Lat. 50°—58°. Alt. 0—500 (?) yards. T. 49°—46° (43° ?).

§ 2. *Aphyllopoda* (without root-leaves). Stem leafy, never forming rosettes at the base.

27. *H. prenanthoides*, Vill. Rough-bordered Hawkweed. E. B. 2235 (?). Stem erect, simple, leafy. Leaves sessile, clasping, oblong, *rounded at, and contracted above the base*, tapering both ways, slightly toothed, hairy or downy, especially below, upper leaves ovate-lanceolate. Heads not large, numerous, corymbose, several on one peduncle. Pedicels and bracts hairy, with many black setæ. Bracts in one row, lanceolate, with some very short ones at the base. Fruit *smooth*, slightly ribbed (?). Scotland and north of England. Perennial. August.

Note.—The fig. E. B. quoted above agrees but indifferently with my examples of *H. prenanthoides*.

28. *H. strictum*, Fries. Johnston, East. Bord. Back. p. 71. Stem rigid, hollow, leafy, branching. Leaves numerous, scattered, narrowed at the base and half-clasping, ovate or oblong, toothed, acute, glabrous above, glabrous, or slightly hairy below, glaucous, three-nerved. Heads roundish when the plant has done flowering, with a few black, slightly glandular hairs. Bracts blunt, marginal florets ciliate. Fruit tawny black. *H. denticulatum*, E. B. 2122 (?). In mountainous parts of England and Scotland. Perennial. July, August.

29. *H. umbellatum*, Linn. Narrow-leaved Hawkweed. E. B. 1771. Stems erect, leafy, simple or branching at the top, more or less hispid or hairy, or quite smooth, round, tapering, two-three feet high. Lower leaves decayed before flowering; stem-leaves numerous, linear-lanceolate, toothed or lobed or entire, attenuated at the base, diminishing gradually from the base to the top of the stem, especially in length. Bracts of the involucre unequal, lanceolate, more or less recurved at the tips. Flowers large, in an umbellate corymb or compound panicle. In woods. Perennial. July—September.

A. 17, C. 60. Lat. 50°—59°. Alt. 0—300 yards. T. 52°—45°.

30. *H. crocatum*, Fries. *H. inuloides* (?), Tausch. Broad Smooth Hawkklung. Back, p. 74. Stems erect, rigid, solid, or nearly filled with a pith-like substance, smooth, or only slightly downy, shining, leafy, branching, especially at the top. Leaves scattered, sessile, oblong-ovate or lanceolate, attenuated below, upper stem-leaves rounded or cordate at the base, half-clasping, lanceolate, all nearly or quite smooth, toothed, especially above or in the middle; teeth pointing forwards, large on the lower and small on the upper

leaves. Heads cylindrical, in spreading corymbs, not numerous, on short pedicels, clothed with whitish (stellate) down. Bracts unequal, bluntly keeled, lanceolate or linear, with abruptly pointed tips; outer black, inner green, outer invested with a few black bristles and white short hairs above. Florets not large, deep yellow, scarcely hairy on the outside. Fruit tawny-black. North of England and Scotland; Aberdeenshire (?). Perennial. July.

A. 6, C. 12. Lat. 54° — 58° . Alt. 100—400 yards. T. 47° — 42° .

31. **H. rigidum**, Fries. Rigid Hawkweed. Back. p. 76. Stems erect, slightly reclining at the base, simple, branching only at the top, rigid, glabrous, except at the top, leafy. Leaves (root-leaves decay before flowering), elliptical-lanceolate, narrowed at both ends, strongly and widely-toothed, teeth spreading, upper leaves lanceolate, sessile. Heads corymbose; peduncles slightly downy above. Bracts flat, lanceolate, black, nearly smooth, the margins slightly paler. Fruit brownish, crowned with soft feathery pappus. Mountainous districts. North of England; North Wales. Perennial. July—September.

H. rigidum has a more divaricate panicle than *H. boreale*, and the leaves which subtend the flowering branches are longer, and not rounded and cordate at the base.

32. **H. corymbosum**, Fries. Corymbose Hawkweed. Back. p. 77. Stem erect or ascending, rigid, furrowed, tapering, hairy below, nearly smooth and shining above, branching at the very summit, or near to it, leafy. Leaves lanceolate, tapering at both ends, toothed; teeth small, and somewhat erect; lower leaves elongated, all sessile, alternate, contiguous, and slightly pubescent. Heads corymbose, on one or two-flowered, downy, not bristly peduncles, which are furnished with linear bracts. Bracts of the involucre unequal, flattish, with green edges, and black in the centre, blunt, downy, neither bristly nor glandular; lower ones lax and slightly spreading. Fruit ribbed, shining, tawny black, crowned with brown, rough fibres. Upper Teesdale, Mr. J. G. Baker. Perennial. July.

33. **H. boreale**, Fries. *H. sabaudum* (?), Sm. Broad-leaved Hawkweed. E. B. 349, Back. p. 79. Stems erect, round, striated, simple, branching above, with short, rigid hairs. Leaves sessile; root-leaves small, decaying before flowering; lower stem-leaves ovate-oblong; upper ones ovate-acute, all toothed, teeth distant. Flowers (heads) in lax, simple, or compound panicles; erect or slightly spreading. Pedicels furnished with a few herbaceous scales, not glandular. Bracts imbricated, close, the lower ones only spreading or lax, lanceolate. Marginal florets large, with five acute teeth. Fruit attenuated and curved at the base, angular, ribbed, shining, brown or black, with a crown of rough fibres. Yorkshire. Perennial. August.

A. 16, C. 70. Lat. 50° — 58° . Alt. 0—200 yards. T. 51° — 46° .

H. sabaudum. Crown not quite twice the length of the fruit. Stem ascending or erect, rigid, wiry, hairy and leafy. Leaves rounded at the base, broadly ovate, abruptly pointed, toothed. Flowers corymbose, on hairy, not glandular stalks. Bracts of involucre unequal,

ovate-lanceolate, blunt, hairy. Florets hairy externally, marginal ones deeply and finely toothed. Seeds shining, beautiful deep brown, not very prominently ribbed, very minutely tubercled (shagreened?). A cultivated example. Perennial. July.

SUB-ORDER.—Ambrosiaceæ. Link. THE BURWEED FAMILY. Annual plants, with alternate petioled leaves. Heads of flowers contiguous, in spikes, the upper ones barren, the lower fertile.

Xanthium, Linn. Burweed. Herbaceous or somewhat shrubby, rather downy plants. Leaves alternate, stalked, simple, lobed, with stipules. Flowers monœcious, axillary, and terminal, spicate, inconspicuous. Involucre of male flowers globular, many-flowered. Bracts free, equal, imbricated. Receptacle scaly. Involucre of female flowers with leafy, prickly bracts. Corolla none. Stigmas undivided.

X. strumarium, Linn. E. B. 2544, L. C. p. 15. Stem erect, branched. Lower leaves lobed, cordate, coarsely toothed. Beaks of the fruit two, straight. Very rare. On mud in Battersea Fields, 1853.—Mr. J. T. Syme.

ORDER LXXIII.—DIPSACEÆ. THE SCABIOUS OR TEASEL FAMILY.

Herbaceous plants, or under-shrubs. Leaves opposite or whorled. Flowers capitate, on a common conical or cylindrical receptacle, with



Fig. 169.—*Dipsacus sylvestris*. 1, Entire flower; 2, section of corolla; 3, section of ovary; 4, fruit and part of the involucre; 5, section of fruit.

a many-leaved involucre. Calyx membranous, with a scarious involucre. Corolla tubular, with an oblique four- or five-lobed limb, im-

bricated in prefloration. Stamens four. Ovary one-celled, adherent, with a single pendulous ovule. Style filiform. Fruit dry, indehiscent, crowned by the calyx, one-celled, one-seeded, not shining, enclosed in the persistent involucre. Seed pendulous, testa adhering to the pericarp. Embryo straight, in a fleshy albumen. Radicle towards the hilum.

SYNOPSIS OF THE GENERA.

Dipsacus. Involucre leafy, with prickly points.

Scabiosa. Involucre imbricated with small leaf-like bracts. Receptacle scaly. Fruit nearly cylindrical.

Knautia. Involucre as in *Scabiosa*. Fruit four-sided.

I. *Dipsacus*, Linn. Teasel. Herbaceous plants, biennial, with rough, often angular and furrowed stems, either prickly or hairy. Leaves often connate. Involucre leafy. Receptacle of the florets conical, beset with scales, which terminate in a long spinous point. Calyx minute, entire, persistent, crowning the ovary. Outer calyx (involucre) forming a rim to the ovary. Corolla tubular, erect, with a four-five-lobed limb, the outer lobe being the largest. Filaments capillary, with oblong incumbent anthers. Pistil with a thread-shaped style, and simple or cloven stigma. Fruit sessile, oblong, four-angled.

1. ***D. sylvestris*, Mill.** Teasel. E. B. 1032, L. C. 539. Stems robust, rigid, furrowed, angular, hollow; angles furnished with strong, deflexed, hooked prickles. Root-leaves petioled, narrowed below; stem-leaves, except the uppermost, connate at the base, forming a deep cavity; all oblong-lanceolate, entire or toothed, the midrib very prominent, and armed with prickles similar to those on the stem. Bracts linear, subulate, prickly, bent, ascending, *longer than the heads*. Flowers rosy, in large, dense, ovate heads. Scales of the receptacle abruptly ending in a long, spinous, ciliated point. Calyx-limb truncate, densely hairy, ciliated. Fruit four-angled. Moist hedges and ditches. [▲]Biennial. July, August. *Kinnoul hill wood*

A. 16, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

2. ***D. Fullonum*, Willd.** Fullers' Teasel. E. B. 2080, L. C. Excluded Species. This form agrees with *D. sylvestris* in the stem and leaves; the latter are rather more deeply connate than in the preceding. *The involucre leaves are not so long as the heads are*. The point of the involucre scale is recurved at the summit. Found occasionally in the West of England. Avon New Cut, Bristol. Biennial. July, August.

Alien. A variety of the foregoing?

3. ***D. pilosus*, Linn.** Shepherd's Rod. E. B. 877, L. C. 540. Stems robust, branched, channelled, with unequal prickles. Leaves in three unequal segments, the midrib furnished with weak prickles. Leaflets of the involucre linear-lanceolate, with a spinous point, spreading and reflexed. Heads *globular*. On chalky and limestone soils, in shady places. Biennial. June—August.

A. 9, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

II. *Scabiosa*, Linn. Scabious. Herbaceous, rarely shrubby, plants. Stem round. Leaves rough or hairy, usually divided or compound. Involucre imbricated, consisting of several rows of leaf-like bracts. Receptacle scaly. Outer calyx membranous, plaited. Inner calyx with five awl-shaped, elongated, bristly segments. Corolla tubular, dilated upwards with a four- or five-cleft, equal or unequal, limb. Filaments and anthers as in *Dipsacus*. Pistil with a thread-shaped style, and obtuse cloven stigma. Fruit almost cylindrical, and furrowed, crowned with both the calyxes.

1. ***S. succisa*, Linn.** Devil's-bit Scabious. E. B. 878, L. C. 541. Root short, truncate; stems erect or ascending, round, leafy, hairy, divided above into peduncles, rarely quite simple. Lower and root-leaves oblong or oblong-lanceolate, petioled, entire, or toothed; upper ones linear sessile. Flowers blue, rarely white, all equal. Receptacle chaffy, chaff linear, tapering below. Involucel of the fruit (outer calyx) hairy, with a short erect limb, surpassed by the black awned teeth of the calyx. Meadows, pastures. Perennial. August.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—850 yards. T. 52°—38°.

2. ***S. Columbaria*, Linn.** Mountain Scabious. E. B. 1311, L. C. 542. Root woody. Stems erect or ascending, simple or branching into very long peduncles, round, downy, often leafless except at the base. Root-leaves obovate or oblong-blunt, attenuated into long petioles, crenulate, rarely incised; stem-leaves *pinnatifid*, with *linear-lanceolate, entire or toothed segments*. Outer florets large, radiating. Receptacle chaffy. Involucel of the fruit downy, angular, with a scarious campanulate limb, about one-quarter of the length of the black awns of the calyx. Chalky pastures. Perennial. July.

A. 13, C. 40. Lat. 50°—58°. Alt. 0—450 yards. T. 51°—45°.

III. *Knautia*, Coult. Perennial herbaceous plants, with *pinnatifid, toothed, or entire leaves*. Flowers in hemispherical heads, subtended by a leafy involucre. Receptacle *hairy, not scaly or chaffy*. Involucel (outer calyx) minute, with four short teeth. Calyx furnished with six-eight erect awns. Fruit four-angled. Distinguished from *Scabiosa* by its hairy not scaly receptacle.

***K. arvensis*, Coult.** Field Scabious. E. B. 650, L. C. 543. Root oblique, creeping. Stem erect, rigid, hairy, branched above the middle, two-three feet high. Root-leaves oblong-lanceolate, tapering at both ends, toothed or incised. Stem-leaves usually *pinnatifid*, with lanceolate or linear lobes. Flowers on long peduncles, rose-lilac, the exterior ones larger than those of the interior; corolla four-cleft, with very unequal lobes. In pastures and grassy places about fields. Perennial. June—August.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

Sub-var. *pinnatisecta*. Leaves *pinnatifid* or *pinnate*, even the root-leaves.

Var. *β. integrifolia*. Leaves *entire, or obscurely toothed or sinuated, not pinnatifid*; stems slender, often simple.

ORDER LXXIV.—**VALERIANACEÆ**, D. C. THE VALERIAN FAMILY.

Herbaceous, annual, or perennial plants. Stems branching, usually forked. Radical leaves in tufts. Stem-leaves opposite, simple, or compound. Flowers in axillary and terminal cymes, aggregate or solitary in the forks, perfect, rarely unisexual by abortion, almost regular. Calyx gamosepalous, regular or irregular. Corolla gamopetalous, inserted on a disk at the top of the calyx-tube, tubular-funnel-shaped, regular or swelling at the base, or spurred; limb usually five-lobed, imbricated in prefloration. Stamens one-three, inserted in the lower part of the tube of the corolla. Ovary adherent to the calyx, with three one-seeded carpels, or with three cells, one of which is fertile, and two barren. Ovule suspended. Fruit dry, one-seeded, not opening, usually crowned by the limb of the calyx, or by a feathery plume. Albumen wanting. Radicle directed towards the hilum.

SYNOPSIS OF THE GENERA.

Centranthus. Corolla five-lobed, with a spur.

Valeriana. Perennials. Corolla five-lobed, gibbous, without a spur. Fruit one-celled.

Valerianella. Annuals. Corolla five-lobed, without a spur. Fruit three-celled.



Fig. 170.—Flower of *Valeriana officinalis*, magnified.

I. *Centranthus*, D. C. Red Valerian. Spurred Valerian. Stem glabrous, glaucous. Leaves entire; flowers red, rarely white, in axillary and terminal cymes, contiguous, forming a close corymb. Calyx minute, persistent. Corolla tubular, five-lobed, spurred at the base. Stamen one. Fruit one-celled, crowned with the calyx and a feathery pappus.

1. ***C. ruber***, D. C. Common Red Valerian. E. B. 698, L. C. 529. Stems erect, round, glabrous. Leaves thick, glaucous, ovate or lanceolate, entire, sometimes slightly sinuate at the base. Spur longer than the ovary, and shorter than the tube of the corolla. The type of this species has ovate-lanceolate leaves. Chalk pits and walls. Naturalized. Perennial. June. Plentiful in many parts of North Kent, about Greenhithe, Northfleet, &c. Associated with *Antirrhinum majus*.

Alien. A. 11.

Var. β . Leaves lanceolate. Is this variety found wild in England?

2. ***C. Calcitrapa***, Dufr. Stem smooth. Root-leaves ovate; stem-leaves pinnatifid. Flowers in panicles. Spur very short. This species is naturalized on a wall at Eltham, Kent, where it has grown

for many years. Is this its only English locality? It has been observed here for at least thirty years.—A. I. Annual. April, May. Alien. A. 3.

II. *Valeriana*, Linn. Valerian. Perennial, herbaceous, mostly glabrous plants, with divided leaves, and white or rose-coloured flowers. Calyx-limb *involute during floration* (flowering), *afterwards forming a crest*. Corolla *gibbous at the base*, not spurred. Stamens three. Fruit one-seeded, crowned with a silky plume. (See Fig. 170.)

1. ***V. officinalis*, Linn.** Common Valerian. E. B. 698, L. C. 532. Root vertical, truncate, usually throwing out rooting, aerial stolons. Stem erect, grooved, fistular, leafy, branching at or near the top. Leaves all pinnate, with oblong, toothed, or entire segments, the terminal ones confluent. Flowers perfect, in corymbose, axillary, and terminal cymes. Fruit glabrous. In moist places, near hedges or rivers, &c. Perennial. June—August.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—650 yards. T. 52°—41°.

This plant varies in the number of leaflets, viz., from four to eight pairs (seven-ten pairs, Babington). We are unacquainted with *V. sambucifolia* of continental authors; but as it has been introduced to the botanists of Britain on high authority, we subjoin a description copied from a German Flora.

V. sambucifolia, Mikan. Stem round, striated (gestreift). Radical and stem-leaves pinnate; the uppermost simple, entire. Like the former (Voriger ähnlich). Leaflets of the root-leaves nine-eleven, broadly ovate, coarsely toothed; leaflets of the stem-leaves lanceolate, toothed; bracts linear. We would, with deference, request our readers to examine the plants for themselves, in order to ascertain whether all these characters are not present in *V. officinalis*.

In *V. sambucifolia* the leaves are described as all pinnate; in *V. officinalis* the upper leaflets are united to the common stalk by their entire base, and the compound leaf is precisely pinnate on the lower portion and pinnatifid on the upper. The number of pairs of leaflets varies as above stated.

The var. *sambucifolia* is common in the south and middle of England. The form *V. officinalis* was observed in North Wales, between Cann Office and Mallwydd, and in the Highlands of Perthshire.

2. ***V. dioica*, Linn.** Marsh Valerian. E. B. 628, L. C. 531. Stems erect, striated, hollow, twelve-eighteen inches high. Leaves glabrous; root-leaves and leaves of the barren shoots *simple, ovate or oblong, entire*; stem-leaves *lyrate-pinnatifid, with entire segments*. Flowers dioecious, in corymbose, dense, axillary, and terminal cymes. Fruit glabrous. Boggy meadows and marshy places. Perennial. May, June.

A. 16, C. 50. Lat. 50°—57°. Alt. 0—450 yards. T. 51°—43°.

3. ***V. pyrenaica*, Linn.** Heart-leaved Valerian. E. B. 1591, L. C. 533. Stems erect, glabrous, furrowed, about two-three feet high. Root-leaves cordate, on long, fleshy, furrowed, petioles, with a toothed or sinuate margin; stem-leaves usually with two pairs of smaller leaflets below, serrated; floral-leaves ovate. Flowers small,

ORDER LXXIV.—**VALERIANACEÆ**, D. C. THE VALERIAN FAMILY.

Herbaceous, annual, or perennial plants. Stems branching, usually forked. Radical leaves in tufts. Stem-leaves opposite, simple, or compound. Flowers in axillary and terminal cymes, aggregate or solitary in the forks, perfect; rarely unisexual by abortion, almost regular. Calyx gamosepalous, regular or irregular. Corolla gamopetalous, inserted on a disk at the top of the calyx-tube, tubular-funnel-shaped, regular or swelling at the base, or spurred; limb usually five-lobed, imbricated in prefloration. Stamens one-three, inserted in the lower part of the tube of the corolla. Ovary adherent to the calyx, with three one-seeded carpels, or with three cells, one of which is fertile, and two barren. Ovule suspended. Fruit dry, one-seeded, not opening, usually crowned by the limb of the calyx, or by a feathery plume. Albumen wanting. Radicle directed towards the hilum.

SYNOPSIS OF THE GENERA.

Centranthus. Corolla five-lobed, with a spur.

Valeriana. Perennials. Corolla five-lobed, gibbous, without a spur. Fruit one-celled.

Valerianella. Annuals. Corolla five-lobed, without a spur. Fruit three-celled.



Fig. 170.—Flower of *Valeriana officinalis*, magnified.

I. *Centranthus*, D. C. Red Valerian. Spurred Valerian. Stem glabrous, glaucous. Leaves entire; flowers red, rarely white, in axillary and terminal cymes, contiguous, forming a close corymb. Calyx minute, persistent. Corolla tubular, five-lobed, spurred at the base. Stamen one. Fruit one-celled, crowned with the calyx and a feathery pappus.

1. *C. ruber*, D. C. Common Red Valerian. E. B. 698, L. C. 529. Stems erect, round, glabrous. Leaves thick, glaucous, ovate or lanceolate, entire, sometimes slightly sinuate at the base. Spur longer than the ovary, and shorter than the tube of the corolla. The type of this species has ovate-lanceolate leaves. Chalk pits and walls. Naturalized. Perennial. June. Plentiful in many parts of North Kent, about Greenhithe, Northfleet, &c. Associated with *Antirrhinum majus*.

Alien. A. 11.

Var. β . Leaves lanceolate. Is this variety found wild in England?

2. *C. Calcitrapa*, Dufr. Stem smooth. Root-leaves ovate; stem-leaves pinnatifid. Flowers in panicles. Spur very short. This species is naturalized on a wall at Eltham, Kent, where it has grown

limb obliquely truncate, with a *pointed* or slightly blunt *tooth*, much narrower than the fruit. Fruit ovate, roundish, three-lobed, each lobe with a filiform nerve, and separated by unequal furrows. Barren cells larger than the fertile cell, separated by a thin partition. Fields. Rare. Annual. May—August.

Range as above. (See "Cybele," vol. ii., p. 28.)

5. *V. eriocarpa*, Desv. Hairy-fruited Corn-Salad. Fruit-bearing cyme dense. Calyx-limb obliquely truncate. Fruit ovate, slightly compressed, hairy; hairs in two longitudinal lines. Fields. Rare. Great Orme's Head. Annual. June.

A variety?—Mr. Babington.

ORDER LXXV.—**RUBIACEÆ**, Juss. in part. *Stellatæ*, Linn. THE MADDER FAMILY.



Herbaceous, rarely woody, plants. Stems four-angled. Leaves whorled, sessile. Flowers usually in trichotomous or dichotomous (three-forked or forked) cymes, lateral or terminal, or in panicles or leafy corymbs, rarely in terminal heads. Sepals four-six, in a tube united with the ovary. Corolla gamopetalous, inserted at the top of the calyx-tube, four-five-cleft, rarely three-cleft, rotate, funnel-shaped, or nearly bell-shaped. Stamens four-five, inserted in the tube of the corolla. Ovary united with the calyx, composed of two carpels, or one by abortion. Styles two, free or united. Fruit dry, rarely fleshy, rarely crowned by the adhering calyx-limb, consisting of two one-seeded carpels, separating when ripe. Embryo in a horny albumen. Radicle approaching the hilum.

SUB-ORDER.—**Stellatæ**. THE MADDER TRIBE. Herbaceous plants, with quadrangular stems and whorled exstipulate leaves. Flowers paniced or corymbose. Calyx four-five- or six-lobed. Corolla rotate or tubular, with as many lobes as the calyx has. Stamens equal in number to the lobes of the corolla, and alternate with them. Ovary simple, two-celled, containing a solitary erect ovule in each cell. Stigmas two. Fruit a didymous, indehiscent pericarp, with two cells and two seeds.

Fig. 171.—2, A Rubiaceous Flower; 3, section of the same; 4, pistil; 5, section of ovary, showing the two carpels; 6, transverse section of the nucules (two carpels).

SYNOPSIS OF THE GENERA.

Sherardia. Fruit crowned with the six-toothed calyx.

Asperula. Corolla funnel-shaped.

Galium. Corolla rotate.

Rubia. Corolla rotate or campanulate; fruit succulent.

I. *Sherardia*, Linn. Field Madder. Annual plants, with rough prostrate stems. Leaves four-six, rarely eight, in a whorl. Flowers nearly sessile, surrounded by the uppermost whorl. Calyx six-toothed, enlarging after flowering. Corolla funnel-shaped, with a slender elongate tube, and a four-cleft limb. Stamens four. Fruit crowned by the calyx-teeth.

***S. arvensis*, Linn.** Field Madder. E. B. 891, L. C. 526. Stems numerous, spreading, branched, rough, four-eight inches high. Leaves lanceolate, acute, often acuminate, hispid, fringed at the edges and on the middle nerve. Flowers blue, or rose-lilac, much shorter than the surrounding leaves. Fruit oblong, crowned by the calyx-teeth, covered with short appressed hairs. Fields. Annual. April—October. This plant has been observed eighteen inches high (long), with several flowering branches, and a broad-leaved involucre.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—46°.

II. *Asperula*, Linn. Woodruff. Perennial, rarely annual, plants, usually with smooth stems. Leaves four-eight in a whorl. Flowers white or pinkish, rarely blue, in trichotomous, rarely forked, cymes, either lateral or terminal, rarely in clusters, and surrounded by a leafy involucre. Calyx-teeth short, and not apparent when the ovary is developed. Corolla funnel-shaped or bell-shaped, with a more or less elongate tube. Limb four- rarely three-cleft. Fruit dry, consisting of two carpels without any vestige of the calyx.

1. *A. odorata*, Linn. Scented Woodruff. E. B. 755, L. C. 527. Root creeping. Stems smooth, erect, simple, leafy, six-eight inches high. Leaves oblong-lanceolate or oblong-obtuse, mucronate (with a point), fringed on the edges with sharp prickles, the lower leaves smaller and less numerous than the upper. Flowers white in contiguous cymes, which form a terminal corymb, surrounded by the upper whorl. Corolla funnel-shaped or bell-shaped. Fruit hispid. Whole plant very fragrant when dry, and retaining its scent during many years. Woods. Perennial. May, June.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—400 yards. T. 51°—43°.

2. *A. cynanchica*, Linn. Squinancywort. E. B. 33, L. C. 528. Roots tufted. Stems numerous, some barren, erect or ascending, bluntly four-angled, branching, two-four inches high. Leaves *linear, very narrow*, pointed, fleshy, in whorls of four-six-eight, the uppermost opposite. Flowers white, with a pinky tinge, stalked in cymes, arranged in a corymb. Corolla funnel-shaped, campanulate, with a four-parted spreading limb; the lobes are marked with three red stripes. Fruit hairy; hairs finely tuberculated, stout and hooked. On dry chalky pastures. Perennial. July.

A. 9, C. 25. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

A. arvensis, Linn. Field Woodruff. E. B. 2792, L. C. p. 15. Root annual. Stems erect, simple or branched, almost glabrous, leafy. Leaves in whorls, the lower ones in whorls of four, obovate-oblong, glabrous; the upper ones linear-obtuse, in whorls of four-six, and laxly ciliated. Flowers blue, contiguous, and surrounded by a *many-leaved involucre*, or a series of bracts, which are ciliated with long silky hairs, and exceed the flowers. Tube of the corolla long. Fruit when mature covered with short appressed hairs. Wandsworth steam-boat pier, on rubbish, with many other exotic plants. Annual. June—September. It has been collected here from 1851—1855. It has disappeared since the latter date.—A. I.

Alien. A. 3, C. ?

III. **Galium**, Linn. Bed-Straw. Flowers terminal or lateral. Calyx very minute, with four teeth. Corolla rotate, with a deeply four-cleft limb, and acute, often long-pointed segments. Stamens four, with round anthers. Ovary two-celled. Style cleft, with two capitate stigmas. Fruit dry, with two carpels not crowned by the calyx.

SECT. I.—Stems smooth, glabrous, or pubescent. Flowers yellow.

1. **G. cruciatum**, With. Crosswort. E. B. 143, L. C. 514. Stems weak, diffuse, ascending, simple, with spreading hairs. Leaves ovate-oblong, four in a whorl, hairy, ciliated, pale green. Flowers yellow, some of them barren, in axillary cymes, on short peduncles. Fruit smooth, on reflexed pedicels. Hedges and shady places. Perennial. April—September.

A. 17, C. 75. Lat. 50°—59°. Alt. 0—200 yards. T. 51°—46°.

2. **G. verum**, Linn. Lady's Bed-Straw. E. B. 660, L. C. 513. Stems rigid, erect or ascending, often diffuse, usually simple, with numerous, divergent, short, barren, or fertile branches, more or less rough or downy. Leaves linear, with reflexed margins, and apparently setaceous, rough and pointed, six-twelve in a whorl. Flowers yellow, in terminal leafy panicles. Fruit small, glabrous, soft. Dry banks. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—600 yards. T. 52°—41°.

SECT. II.—Stems smooth, glabrous, or downy. Flowers white.

3. **G. Mollugo**, Linn. Great Hedge Bed-Straw. E. B. 1673, L. C. 519. Stems diffuse reclining or ascending, often robust, branching, *smooth*. Leaves in whorls of eight, oblong, or oblong-ovate, mucronate, more or less rough at the margins. Flowers in terminal and lateral panicles, spreading, rarely erect. Fruit on *divergent pedicels*. Lobes of the corolla cuspidate. Fruit small, glabrous, nearly smooth. Hedges, meadows, &c. Perennial. May—August.

G. erectum, Huds. Upright Galium. E. B. 2607, L. C. 518. Stems with four prominent angles, and two convex and two hollow sides, slightly hairy below, glabrous, shining above. Leaves six-

eight in a whorl, mostly six, oblong pointed, with prickles pointing upwards, and a slender midrib, shining on both sides. Flowers small.

A variety of the preceding (?).

G. cinereum, Sm. E. B. 2783. Leaves linear, six-eight in a whorl.

G. aristatum (?), Linn. Awned Bed-Straw. E. B. 2784, L. C. 519 d. Stems quite smooth and shining, with prominent angles and convex sides, branching. Leaves six in a whorl, linear-lanceolate, tapering at the base, *abruptly pointed*, with a short terminal reflexed bristle, margins toothed with forward-pointing teeth. Flowers axillary and terminal, on diverging branches and divaricated peduncles and pedicels. Carpels unequal, somewhat kidney-shaped, *smooth when green, tubercled when ripe*. Angussshire.—Mr. G. Don. Perennial. July, August.

A. 15, C. 50. Lat. 50°—58°. Alt. 0—400 yards. T. 52°—45°.

4. *G. saxatile*, Linn. Mountain Bed-Straw. E. B. 815, L. C. 517. Stems slender, spreading, erect after flowering, branching, smooth. Leaves four-six in a whorl, *obovate*, with a point, very slightly ciliate, the upper ones oblong or linear-oblong. Flowers white, *in corymbose lateral and terminal panicles*. Lobes of the corolla taper-, not sharp-pointed. Fruit small, glabrous, slightly tuberculate (?). Heaths, very common. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1250 yards. T. 52°—34°.

G. montanum, Vill. (See "Phytologist," N. S., vol. i., p. 182.) Lower leaves lanceolate, upper linear-lanceolate, six-seven in a whorl. Panicle small, sparingly branched. Plant preserving its colour in drying.

In the 5th edition of the "London Catalogue" this is entered as a variety of *G. sylvestre* (*G. pusillum*.)

5. *G. pusillum*, Linn.; *sylvestre*, Poll. Slender Bed-Straw. E. B. 74, L. C. 520. Stems spreading, slender, ascending, branching, smooth, without marginal prickles. Leaves linear, pointed, rarely linear-obovate, six-eight in a whorl. Flowers white, in corymbose panicles, numerous. Fruit erect-spreading, small, very finely or obsoletely tubercled. On limestone soil. Perennial. July.

A. 9, C. 12. Lat. 52°—57°. Alt. 100—700 yards. T. 48°—41°.

G. commutatum, Jord. L. C. 520 b. (See "Phytologist," N. S., vol. i., p. 181.) Mr. Baker, in the above-quoted publication, states that "it may be known from the above by its more numerous and smaller flowers, more spreading panicle, patent branches, thicker and narrower leaves (seven in a whorl), obscurely nerved on the under side, shining and glabrous stems, &c.

SECT. III.—Stems rough, with teeth or prickles on the angles. Flowers white, whitish or reddish.

6. *G. palustre*, Linn. Marsh Goose-Grass. E. B. 1857, L. C. 515. Stems weak, diffuse, straggling, branching, rough, with toothed or prickly prominent angles, rarely smooth. Leaves four-six, oblong-

obovate, rarely quite linear, *blunt, without a point*, margin rough, with forward-pointing teeth. Flowers white, in lax, lateral and terminal corymbose panicles. Petals ovate, pointed. Fruit small, glabrous, smooth. Watery places. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—500 yards. T. 52°—42°.

Var. *elongatum*, Pres. Stem and leaves elongated.

The variety *Witheringii* differs from the above in its slightly rough stem, leaves narrower, and four, five, or six in a whorl, and in its smaller flowers. Wet places, not unfrequent.

7. **G. uliginosum**, Linn. Rough Marsh Bed Straw. E. B. 1972, L. C. 516. Stems weak, diffuse, branched, with *rough angles*. Leaves *five-seven*, oblong or linear-oblong, tapering, mucronate, toothed at the margins and midribs; *the denticulations point upwards*. Flowers terminal and lateral in corymb-like panicles. Fruit small, *with fine tubercles*. Ditches and wet places. Perennial. June—September.

A. 16, C. 70. Lat. 50°—61. Alt. 0—200 yards. T. 52°—45°.

8. **G. anglicum**, Huds. Wall Goose-Grass. E. B. 384, L. C. 521. Stems slender, rough, hairy or prickly, branching; branches rather erect, with about three secondary, flower-bearing branches. Leaves *five-seven*, linear or linear-oblong, revolute, with a prominent midrib (?), decidedly pointed when young, margin prickly, prickles pointing forwards. Flowers in corymbose panicles, lateral and terminal. Petals linear, pointed, with the margins recurved. Fruit small, granulated. Dry fields and stony places. Annual. June—August.

A. 4—5, C. 10. Lat. 51°—53°(55°). Alt. 0—100 yards. T. 49°—48°.

G. saccharatum, All.; *verrucosum* (?), Sm. E. B. 2173, Fl. Gr. 133. Warted Goose-Grass. E. B. 2173, L. C. p. 16. Stems procumbent, spreading, rough, with a few deflexed prickles on the angles. Leaves linear-lanceolate, pointed with marginal, forward-pointing prickles. Peduncles axillary, usually three-flowered, the central flower only fertile. Flowers small, pale yellow. Fruit large, spherical (one or two globes), *yellow, entirely covered with elevated tubercles*. North of England and Scotland. Annual. July, August.

Is this a genuine native?

9. **G. tricornis**, With. Rough-fruited Goose-Grass. E. B. 1641, L. C. 522. Stems trailing, with acute angles and concave sides, branching, angles furnished with strong, hooked, or deflexed prickles. Leaves six-eight in a whorl, linear, tapering at both ends, with a point (mucro), with strong deflexed prickles on their margins. Flowers white, in axillary *three-flowered cymes*, very small, one or two generally abortive. Fruit large, black, warty, with white prickles, on reflexed pedicels. One of the carpels often abortive. Corn-fields, in a dry, chalky soil. Annual. July.

This was found among other stellate exotics at Wandsworth steam-boat pier.

A. 9, C. 25. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

G. tricornis differs from *G. Aparine* in having granulated not bristly fruit, which is rather more reflexed than in the commoner species, *G. Aparine*.

10. **G. Aparine**, Linn. Goose-Grass. E. B. 816, L. C. 523. Stems weak, trailing, very rough, with prickly angles. Leaves six-eight in a whorl, obovate-oblong or linear-oblong, strongly ciliated with hooked prickles, the upper prickles pointing forwards, the rest pointing downwards. Flowers few, axillary, on common peduncles, more or less spreading or divaricated. Fruit large, with hooked bristles. Hedges and bushy places. Annual. June.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—45°.

G. spurium (?), Linn. Smooth-fruited Corn Goose-Grass. E. B. 1871, L. C. p. 16. Stems with blunt angles and furrowed sides, shining, prickly, prickles pointing backwards, branches numerous and leafy. Leaves six in a whorl, linear-lanceolate, with a prickly point, margins armed with forward-pointing bristles (teeth), midrib prominent. Flowers white, on axillary opposite branches; peduncles and pedicels ascending. Corolla spreading, with long-pointed, reflexed lobes. Fruit smooth. Annual. August.

G. Vaillantii, D. C. E. B. 2943, *floribundum* (?). Fl. Gr. 134. L. C. 524. This plant approaches both *G. Aparine* and *G. tricornis* in its characters. It agrees with both in its trailing, prickly, hooked stems. Its leaves are broader than those of *G. tricornis*, and narrower than in *Aparine*; its fruit is more like that of *G. Aparine* than that of *G. tricornis*. Saffron-Walden.—Mr. Gibson.

Note.—*G. spurium* is called a narrow-leaved variety of *G. Aparine* by Coss. and Ger., "Flore des Environs de Paris," and *G. Vaillantii* is termed a sub-variety.

A. ?, C. P. Lat. 51°—57°. Alt. 0—100 yards. T. 59°—47°.

11. **G. boreale**, Linn. Cross-leaved Bed-Straw. E. B. 105, L. C. 525. Stems erect or ascending, branching, with prominent angles and convex sides, hairy. Leaves ovate-lanceolate, four in a whorl. Flowers white, in terminal corymbs. Peduncles spreading when in fruit. Fruit covered with long slender bristles. Rocky, subalpine places. Perennial. July. *A. C. Ye*

IV. **Rubia**, Linn. Madder. Stem and leaves as in the preceding genera, only the latter are evergreen and the stem sometimes shrubby. Calyx either very minute, with four teeth, or wanting. Corolla campanulate, with a four- or five-cleft limb and deep segments. Stamens four-five, with awl-shaped filaments and round anthers. Ovary of two cells, with a short cleft style, and capitate stigma. Fruit a two-lobed berry, not crowned by the calyx teeth.

R. peregrina, Linn. Wild Madder. E. B. 815, L. C. 512. Stems diffuse, contiguous, branching, rigid, rough, with acute prickly angles and deeply concave sides, woody or persistent at the base. Leaves in fours, oblong-lanceolate, with prickly margins and keels, with spinous points. Lobes of the corolla ovate pointed. Stony or

rocky shady places in the south and south-west. In Sussex, Isle of Wight, Gloucestershire, &c. Perennial. July.

A. 6, C. 20. Lat. 50° — 54° . Alt. 0—100 yards. T. 52° — 49° .

ORDER LXXVI.—**CAPRIFOLIACEÆ**, Rich. THE HONEYSUCKLE FAMILY.

Shrubs or herbaceous plants, with opposite, exstipulate leaves. Flowers usually corymbose, and mostly scented. Calyx four-five-

cleft. Corolla, in the British species, tubular, rotate, or campanulate, in the exotic species often polypetalous. Ovary adherent, one-three- or four-celled, one cell being often one-seeded, the others many-seeded. Style single. Stigmas one-three or four. Fruit indehiscent, dry, or succulent, crowned by the persistent calyx. Seeds suspended, usually compressed. Embryo small, in a fleshy or horny albumen. Radicle towards the hilum.



Fig. 172.—*Lonicera Caprifolium*. 1, Entire flower; 2, stamen; 3, transverse section of the ovary; 4, vertical section of the same; 5, stigma; 6, fruit; 7, section of seed; 8, seed entire.

TRIBE I.—**Sam-
bucineæ**. Corolla rotate. Fruit three-five-celled, and one ovule in each cell. Stigmas three-five, sessile, or on three-five distinct styles.

SYNOPSIS OF THE GENERA.

Viburnum. Corolla bell- or funnel-shaped; fruit one-seeded.
Sambucus. Corolla rotate; fruit three-four-seeded.

I. **Viburnum**, Linn. Guelder-Rose. Small trees, with opposite, petiolate, toothed, or lobed leaves. Flowers white, in branching corymbs. Calyx five-toothed or five-lobed. Corolla rotate or rotate-campanulate. Stamens five, stigmas three, sessile. Fruit a berry, one-celled, and one-seeded by abortion.

1. **V. Lantana**, Linn. Wayfaring Tree. E. B. 331, L. C. 507. Low tree, with flexible, downy branches. Leaves ovate or oblong,

sharply toothed, with prominent nerves and dense, rusty down, especially beneath. Flowers white, in a large, flat corymb. Corolla rotate. Fruit oblong, pointed, flat, red before its maturity, then black. Hedges in chalky places; not uncommon. Perennial. May.

A. 7, C. 25. Lat. 50° — 54° . Alt. 0—200 yards (feet in "Cybele"). T. 51° — 48° .

2. **V. Opulus**, Linn. Guelder-Rose. E. B. 332, L. C. 506. Tree, sometimes of considerable size. Leaves glabrous, or nearly so, above, pale green beneath, and more or less pubescent, *three-lobed*; lobes sinuate, or laxly and unequally toothed, with linear stipules, two on each side, and several cup-like glands along the margins of the petiole (abortive leaves). Flowers in a flat corymb; the central campanulate-rotate, *fertile*; those of the margin much expanded, and flat, barren. Fruit *a round, red berry*. Moist hedges and woods. Flowers in June, bears fruit in September, October.

A. 17, C. 75. Lat. 50° — 58° . Alt. 0—250 yards. T. 51° — 44° .

II. **Sambucus**, Linn. Elder. Stem arborescent, rarely herbaceous. Leaves opposite, compound, stalked. Flowers in terminal, branching corymbs or panicles. Calyx minute, with five small segments. Corolla rotate, slightly concave, with five deep, obtuse segments. Stamens five, awl-shaped, with roundish heart-shaped anthers. Ovary three-five-celled, or one-celled by the destruction of the partitions, obtuse, with three sessile obtuse stigmas. Fruit a berry containing three-five seeds.

1. **S. Ebulus**, Linn. Danewort. E. B. 475, L. C. 505. Stems herbaceous, erect, branching. Leaves pinnate, with an odd leaflet. Leaflets linear-lanceolate, unequal at the base, or with a small leaflet there, sharply serrated. Flowers white, in large, branching cymes. Anthers purplish. Banks of ditches, &c.; rare. Perennial. June. Ripens fruit in August, September.

A. 17, C. 50 or 60. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 46° .

2. **S. nigra**, Linn. Common Elder. E. B. 476, L. C. 504. Tall shrub, or small tree. Branches containing much pith. Leaves compound, three-seven leaflets, petioled; leaflets glabrous, ovate-pointed, or tapering, toothed. Stipules none, or very small. Corymb flat, with three-five principal branches, which are much subdivided. Flowers white, with a sharp, disagreeable odour. Fruit black, shining. Hedges. Perennial. June. Ripens fruit in September.

A. 16 (18), C. 60 (75). Lat. 50° — 56° (60°). Alt. 0—200 yards. T. 52° — 47° (45°).

TRIBE II.—**Caprifoliæ**. Corolla tubular or campanulate, with a two-lipped or five-cleft limb. Cells of the ovary with more than one seed. Style single. Stigma three-lobed.

SYNOPSIS OF THE GENERA.

Lonicera. Corolla tubular, or funnel-shaped, with five stamens.

Linnæa. Corolla turbinate, or campanulate; stamens four, rarely five.

III. **Lonicera**, Linn. in part. Honeysuckle. Small trees or climbing shrubs. Leaves entire. Flowers in terminal heads or in pairs, at the end of axillary peduncles. Calyx adherent, the free part of it five-lobed. Corolla tubular, funnel-shaped, or campanulate. Stamens five. Style filiform. Fruit a succulent berry, with three two-four-seeded cells, or one-celled by the rupture of the partitions.

SECT. I.—Flowers in terminal heads. Twining shrubs.

1. **L. Periclymenum**, Linn. Common Honeysuckle. E. B. 800, L. C. 508. Stems twining, slender, with deciduous bark. Young branches downy. Leaves on short petioles, oblong, or ovate-pointed, coriaceous, hairy, or smooth, sometimes lobed or toothed. Floral leaves *sessile*, not connate (?). Heads globular, bracteate; outer bracts ovate lanceolate, inner ones obovate, roundish, all glandular. Calyx-lobes small, triangular, spreading. Corolla tubular, with an unequally divided limb, the upper segment four-toothed, the lower entire, hairy and glandular. Fruit red, crowned by the calyx. Woods and hedges. June—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—600 yards. T. 52°—42°.

2. **L. Caprifolium**, Linn. Honeysuckle. E. B. 789. Stem *twining*, variable in length. Young branches glabrous, or reddish and glaucous. Leaves roundish or oval or oblong, glabrous on both sides, glaucous, the lower ones stalked, the upper ones connate, the floral ones *united into a flat, round, disk-like, perfoliate leaf*. Flowers sessile, in a terminal head. Tube of the corolla cylindrical, enlarged above, slightly hairy. Segments nearly equal, not quite half the length of the tube, striated, white or yellowish. Fruit red, crowned by the calyx-limb. A shrubby plant. Flowers in May; ripens fruit in July—September.

Alien? A. 14, C. ?

SECT. II.—Flowers in pairs. Erect shrubs.

3. **L. Xylosteum**, Linn. Fly Honeysuckle. E. B. 916, L. C. 510. Stems *erect, not twining*. Leaves softly pubescent, especially below, ovate or oblong-pointed, on short petioles. Corolla irregular, campanulate, *with a short tube, and lateral protuberances* (gibbosities). Peduncles axillary, two-flowered. Fruit in twins, slightly coherent. Hedges. Small shrub. Flowers, June. Fruit, September. Said to be truly wild in Sussex. *Woods near Hove near Perth John Sim*

A. 1, C. 1. Lat. 50°—51°. Alt. ? T. 50°.

IV. **Linnæa**, Linn. Linnæa. Stem shrubby, trailing, and branching, with petiolate, roundish leaves. Calyx-limb five-cleft. Segments erect, lanceolate, acute. Corolla campanulate, with a five-cleft limb, and nearly equal segments. Stamens four, didynamous, with versatile anthers. Ovary globular, three-celled, with cylindrical style, and obtuse stigma. Fruit a dry, three-celled, one-seeded berry; two of the cells barren.

L. borealis, Linn. Two-flowered Linnæa. E. B. 433, L. C. 511.

Stems woody, round, downy or hairy, leafy, trailing, and creeping, in patches. Leaves roundish, or ovate, crenate, and ciliate near the base, on short ciliate petioles, opposite, numerous. Peduncles slender, round, tapering, two-flowered; flowers two, pinky, pendulous, on short, bracteate, glandular pedicels. Corolla variegated internally with rosy and yellow patches. Kingausie, Kincardineshire, Scotland. Woods at Craibstone, near Aberdeen. Perennial. June. *Wood at Craibstone discovered by John Sem 1859*

A. 4, C. 10. Lat. 55°—58°. Alt. 100—850 yards. T. 46°—38°.

ORDER LXXVII.—**CUCURBITACEÆ**, Juss. THE GOURD FAMILY.

Succulent plants, with climbing stems, rough leaves palmate or with palmate nervation. Flowers axillary, generally monœcious.



Fig. 173.—*Bryonia dioica*. 1, Branch with male and female flowers; 2, male flower; 3, section of the same; 4, ovary and stigmas of female flower; 5, transverse section of ovary; 6, seed.

Calyx minute, five-toothed, or sometimes obsolete. Corolla five-parted, or five-lobed or toothed, with reticulated veins. Stamens five.

Ovary two- three- or one-celled by disruption, with three parietal placentas. Fruit fleshy, with flat, oval seeds.

Bryonia, Linn. Briony. Root fleshy, sometimes very large; stems climbing by tendrils; leaves cordate, palmate or lobed; flowers small, greenish-white, in axillary corymbs. Corolla of barren flowers five-cleft. Stamens five, in three parcels, inserted at the base of the corolla. Filaments short; anthers forming a sinuous line (like an S). Calyx-tube of fertile flower roundish, constricted above the ovary into a narrow neck. Fruit a berry, three-celled, containing six-seeds or fewer by abortion. Seeds roundish, obovate, slightly compressed, and with a narrow border.

B. dioica, Jacq., Linn. White Briony. E. B. 439, L. C. 393. Root cylindrical, very thick, fleshy, often branching. Stems slender, climbing, usually very long, angular, rough, hairy, bristly, or spinous. Leaves hairy, on long petioles, palmate, five-seven-lobed, lobes angular, sinuated. Male flowers larger than the female ones, corymbose, on long peduncles, opposite to a long, twisted (coiled) tentril (abortive peduncle?). Female flowers sessile, or on short peduncles, sometimes solitary. Fruit red when ripe, with viscid juice. Seeds grey, marbled. Hedges, usually near habitations. Perennial. July. Fruit, September.

A. 11, C. 40. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—48°.

+++ Perianth double; corolla polypetalous.

§ Ovary more or less united with the calyx. (Stamens on the ovary, epigynous.)

Araliaceæ are distinguished by their umbellate flowers, and baccate fruit; *Cornaceæ*, by their tetrapetalous flowers, and baccate two-celled fruit; *Loranthaceæ*, by their parasitic growth; *Grossulaceæ*, by their baccate, pulpy, many-seeded fruit; *Saxifragaceæ*, by their herbaceous habit, and two-celled capsule; *Umbellifereæ*, by their umbellate flowers, and dicarpous fruit; *Haloragaceæ*, by their aquatic habitat, inconspicuous flowers, and four-celled indurated fruit; *Onagraceæ*, by their erect habit, tetrapetalous flowers, and four-two-celled fruit; *Pomaceæ*, trees or shrubs, with conspicuous polyandrous flowers, and pomaceous fruit.

ORDER LXXVIII.—**ARALIACEÆ**, Juss. THE IVY FAMILY.

Trees, shrubs, or herbs, with alternate, exstipulate leaves and umbellate flowers. Calyx entire or toothed. Petals five-ten, deciduous, valvate in æstivation (prefloration). Stamens equal to or double the number of the petals. Ovary with more than two cells. Styles equal to the number of the cells. Ovules solitary and pendulous. Fruit dry or succulent, composed of several one-seeded cells.

I. Adoxa, Linn. Perennial succulent plants, with scaly bulb-

ous roots, barren shoots, erect flowering stems, and petiolate, tender, trifoliate leaves. Calyx fleshy, two-three-lobed. Corolla rotate, with a four-five-parted limb. Stamens four-five, with divided filaments, which bear an anther-lobe on each division. Styles four-five, distinct, persistent. Fruit baccate-succulent, containing four-five one-seeded cells (the fruit is often one-seeded by abortion). Seeds compressed, with a membranous rim.

A. moschatellina, Linn. Tuberous Moschatel. E. B. 453, L. C. 437. Slender succulent plants, with horizontal, bulbiferous roots, producing erect, flowering stems, and filiform shoots. Flowering stems erect, about six inches high, simple, glabrous, bearing two leaves. Leaves glabrous, with blunt lobes. Flowers greenish yellow, with a slight musky odour, in a terminal, four-six-flowered, round head, the terminal one being in its parts quaternary (four sepals, four petals, &c.) Fruit greenish, semitranslucent (diaphanous), four-five-celled, roundish-triangular, with three, rarely two, spreading, fleshy teeth. In shady places, in woods and under hedges. Perennial. April, May. Fruit in June.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—1100 yards. T. 51°—36°.

II. Hedera, Linn. Ivy. Climbing shrubs, with evergreen, petiolate, smooth, leathery leaves. Flowers umbellate or capitate. Calyx minute, five-toothed. Petals five, broadest at the base, and spreading. Stamens five or ten, erect, with anthers cleft at the base. Ovary three-five-celled, turbinate, with a simple style, or five-ten, more or less combined. Stigma simple. Fruit globular, baccate, one-celled, with from three to five seeds.

H. Helix, Linn. Common Ivy. E. B. 1267, L. C. 438. Stems woody, climbing and rooting. Leaves cordate, often rounded at the base; lower leaves three-five-lobed, upper ones ovate-acuminate, entire. Flowers in compact, globular umbels, on downy pedicels. Petals green, reflexed, pointed, slightly downy. Fruit fleshy, black, surrounded by the limb of the calyx, and crowned by the persistent style. On rocks, old walls, and trees. Flowers, September, October. Fruit, April.

A. 18, C. 81. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—45°.

P P



Fig. 174.—*Hedera Helix* (Ivy). 1, The umbel of flowers, much reduced; 2, a single flower, magnified.

ORDER LXXIX.—**CORNACEÆ**, D. C. THE CORNEL TREE OR DOGWOOD FAMILY.

Trees or shrubs, rarely herbs. Leaves opposite in the British species and in most of the exotic, entire, with pinnate veins. Flowers capitate, umbellate or corymbose. Sepals and petals four, with valvate æstivation (prefloration). Stamens four, alternate with the petals. Ovary two-celled, with a filiform style, and simple stigma. Fruit fleshy, with a two-celled nut, and solitary seeds.



Fig. 175.—1, *Cornus sanguinea* (Dogwood); 2, flower of *C. alba*; 3, fruit of *C. sanguinea*.

Cornus, Tournf. Cornel, Dogwood. Shrubby or herbaceous plants, with simple, entire, generally opposite leaves, and corymbose or umbellate white or yellow flowers. Calyx deciduous, with four minute teeth, united with the ovary. Corolla with four acute, flat petals, broad at the base. Stamens four, with roundish, incumbent anthers. Ovary roundish, compressed, with a thread-shaped style and obtuse stigma. Fruit drupaceous, containing an oblong or cordate two-celled nut, with one kernel in each cell.

1. ***C. sanguinea***, Linn. Dogwood or Cornel Tree. E. B. 249, L. C. 439. Tree, more or less elevated, with downy, opposite, often reddish, branches. Leaves ovate-oblong, acuminate, with prominent nerves, hairy, especially below. Flowers terminal, in branching corymbs, without an involucre.

Fruit dark purple, roundish, crowned by the rim of the calyx. Hedges and plantations. June.

A. 11, C. 50. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

2. ***C. suecica***, Linn. Dwarf Cornel. E. B. 310, L. C. 440. Roots long, creeping. Flowering stems, round, leafy, erect, herbaceous, six inches high, scaly at the base. Leaves ovate, shortly pointed, opposite and sessile, with prominent nerves. Bracts four, obovate or ovate, pointed, petaloid. Flowers very minute, umbellate. Fruit round. On upland moors and hills in Scotland. Perennial. June, July.

A. 5, C. 12. Lat. 54°—59°. Alt. 300—950 yards. T. 42°—37°.

ORDER LXXX.—**LORANTHACEÆ**, Juss. THE MISTLETOE FAMILY.

Parasitical shrubs, with nerveless, exstipulate, fleshy, generally opposite leaves. Inflorescence axillary or terminal, solitary or

corymbose, &c., sometimes monœcious. Calyx bracteated. Corolla with three, four, or eight petals, sometimes wanting. Stamens equal in number to the petals, and opposite. Ovary one-celled, with a pendulous ovule. Style sometimes wanting. Stigma simple.

Viscum, Tournf. Shrubby parasitic plants, with fleshy leaves and dioecious flowers. Calyx of male flower four-cleft. Corolla wanting. Stamens four, with sessile anthers. Calyx of female flower united with the ovary. Fruit a one-seeded pulpy berry. Embryo green.

V. album, Linn. Mistletoe. E. B. 1470, L. C. 503. Shrub, parasitical. Stem repeatedly forked, very much branched, forming a roundish tuft sometimes of several feet high. Leaves oblong-obtuse, fleshy, yellowish-green, narrowed at the base, their nerves only visible when the plant is dried. Flowers sessile, terminal, in small groups very inconspicuous. Fruit pellucid. Flowers in March—May. Fruit, August—December. On White-thorn, Apple-tree, Poplar, &c.

A. 11, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—48°.

ORDER LXXXI.—**GROSSULARIACEÆ**, D. C. THE GOOSEBERRY AND CURRANT FAMILY.

Shrubs, with or without spines. Leaves alternate, lobed, with plicate veneration (pre-foliation). Flowers axillary, in bracteated racemes. Calyx four-five-parted, coloured. Petals five, minute, borne in the throat of the calyx. Stamens five, alternate with the petals. Ovary one-celled, with opposite, parietal placentas and numerous ovules. Style two-three-four-cleft. Fruit baccate, crowned with the remains of the flower and filled with pulp. Seeds numerous, suspended by long funicles among the pulp. Embryo very small, in a horny albumen (perisperm). Radicle towards the hilum.

Ribes, Linn. Currant and Gooseberry.

A genus of shrubs, with petiolate, lobed, notched, deciduous leaves and axillary flowers. Calyx with a five-, rarely four-, deeply-parted, spreading limb, withering on the fruit. Corolla with five, small, obtuse, erect petals, borne by the rim of the calyx. Stamens five, rarely four, on the calyx, with the petals. Anthers two-lobed, compressed. Ovary roundish, with a cloven style and obtuse stigmas. Fruit a berry, with numerous angular, testaceous seeds.



Fig. 176.—1, *Ribes nigrum* (Black Currant); 2, flower.

SECT. I.—Spinous. Peduncles short, one-three-flowered.

1. **R. Grossularia**, Linn. Gooseberry. E. B. 1292, L. C. 406. Stem branching; branches spreading, with one-two-three stout spines below the leaves. Leaves downy, three-five-cleft, lobes blunt, cut and



Fig. 176.—3, *R. nigrum*, in fruit; 4, a single berry.

toothed, usually about three at the extremity of the lateral, very short branches (spurs). Flowers one-three on short peduncles, with minute bracts below the base. Calyx reddish, hairy, the lower part (tube) globular (where connected with the ovary), the upper bell-shaped. Lower part of the petals and filaments and the middle of the style very hairy. Fruit hairy or smooth.

The typical form, *R. sylvestre*, D. C. Leaves small, hairy, or downy. Fruit smooth.

Var. β . *sativum*, D. C. Leaves large, usually glabrous and shining above. The calyx is reflexed only till impregnation is accomplished, afterwards the segments are erect, and close up the apex of the flower and fruit.

Fruit large, of various colours, smooth or hairy. Of this variety there are probably hundreds of forms now or formerly in cultivation. The wild plant is occasionally found in hedges. Flower, April. Fruit, July.

A. 17, C. 60. Lat. 50° — 58° . Alt. 0—350 yards. T. 51° — 43° .

This is reckoned by British botanists among the species of doubtful origin. Yet it is one that we have noticed in our peregrinations in England, Wales, and Scotland as occurring very much more frequently than the other species.

SECT. II.—Without spines.

2. **R. alpinum**, Linn. Mountain Currant. E. B. 704, L. C. 405. Stems erect, with slender, nearly erect branches. Leaves three-lobed, lobes incised, toothed, glistening below, slightly hairy above. Clusters erect, both in flower and fruit. Flowers small, greenish, subtended by elongated brown bracts, and on short pedicels. Fruit deep scarlet. Woods in the north of England. Perennial. May.

A. 10, C. 20. Lat. 51° — 56° . Alt. 0—200 yards. T. 49° — 46° .

3. **R. rubrum**, Linn. Red Currant. E. B. 1289, L. C. 404. Shrub, without spines. Leaves cordate at the base, three-five lobed, lobes crenulate-toothed, glabrous above, downy below. Flowers in axillary, pendulous clusters, yellowish green, pedicelled, with very short bracts. Calyx glabrous, with rotate flat limb. Fruit glo-

bular, glabrous, red, acid. In woods. Cultivated. Flower, April. Fruit, June.

A. 14, C. 50. Lat. 50°—58°. Alt. 0—200 yards. T. 50°—45°.

4. **R. nigrum**, Linn. Black Currant. E. B. 1291, L. C. 403. Shrub without spines. Leaves cordate at the base, three-five-lobed; lobes large pointed, crenulate-toothed. Flowers in axillary, pendulous clusters, subtended by very short, subulate bracts, green. Calyx downy, glandular, with campanulate limb. Fruit globular, black. Every part of the plant has an aromatic savour. Cultivated, rarely spontaneous. Limestone pavement, Ingleborough. Flower, April. Fruit, June.

A. 10, C. 30. Lat. 50°—56°. Alt. 0—200 yards. T. 50°—47°.

ORDER LXXXII. — SAXIFRAGACEÆ, Juss. THE SAXIFRAGE FAMILY.

Perennial or annual plants, growing in tufts or patches, with simple, often leafless stems. Leaves alternate, exstipulate, entire or cleft. Calyx inferior or superior, of five or four sepals, more or less cohering at their base. Petals five-four, sometimes wanting. Stamens ten, rarely eight, hypogynous or perigynous, with three-celled anthers. Ovary more or less adhering to the calyx or free, dicarpous, always diverging at the apex. Stigma sessile. Fruit generally a membranous one- or two-celled capsule, with indefinite, rarely definite seeds. Ovules on the partition or on reflexed placentas, which cover the interior of the valves. Styles two, terminal. Fruit capsular, two-celled (or with two many-seeded carpels), more or less distant at the apex when ripe. Seeds small. Embryo in the centre of the fleshy albumen. Radicle towards the hilum.



Fig. 177.—1, *Saxifraga umbrosa*; a, Root-leaves and stem. 2, Expanded flower, magnified. 3, Ovary, magnified; c, reflexed segments of the calyx; s, spreading stigmas. 4, Longitudinal section of the fruit. 6, A flowering branch, nat. size.

SYNOPSIS OF THE GENERA.

Chrysosplenium. Perianth single, four-five-parted. Stamens eight-ten.

Saxifraga. Perianth double, five-parted. Stamens ten. Capsule two-celled, with two spreading beaks.

I. Chrysosplenium, Linn. Golden Saxifrage. Stems succulent, procumbent. Leaves stalked, simple, notched, kidney-shaped. Flowers terminal and corymbose. Perianth *single*, four-five-parted, with spreading, permanent, internally coloured segments. Stamens eight-ten, short, with roundish two-lobed anthers. Ovary inferior, ovate, with two styles and obtuse stigmas. Capsule one-celled, two-valved, with numerous small seeds.

1. **C. oppositifolium**, Linn. Opposite-leaved Golden Saxifrage. E. B. 490, L. C. 434. Stems spreading, prostrate, rooting, tufted, succulent, downy or hairy, *branching from below*. Leaves roundish, *opposite*, petioled, *not deeply crenulate*, hairy above, glaucous beneath, truncate at the base or attenuated into petioles. Flowers yellow, small, scattered. Moist shady banks and rocks. Perennial. March—May. On Ben Lawers it was flowering in July, 1856.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—1100 yards. T. 50°—36°.

2. **C. alternifolium**, Linn. Alternate-leaved Golden Saxifrage. E. B. 54, L. C. 435. Stems erect or ascending, *branching near the top*, robust, downy below, glabrous above. Leaves alternate; root-leaves large, roundish-reniform, deeply crenate. Flowers deep yellow, nearly sessile, umbellate. Moist rocks, rivulets, &c. Perennial. May.

A. 16, C. 60. Lat. 50°—58°. Alt. 0 (?)—1050 yards. T. 49°—37°.

II. Saxifraga, Linn. Saxifrage. Habit various, generally hairy, often glutinous, with stalked, simple, undivided or lobed leaves. Calyx superior, inferior, or half-inferior, five-parted, persistent. Petals five, inserted in the calyx. Stamens ten, attached to the calyx, with two-lobed anthers. Ovary more or less adherent, tapering into two short, spreading styles, with obtuse, mostly downy stigmas. Capsule two-beaked, two-celled, with numerous small seeds on the partition.

SECT. I.—Stems with decumbent barren shoots at the base.

§ 1. Calyx not adhering to the ovary; sepals reflexed

1. **S. Geum**, Linn. Kidney-leaved Saxifrage. E. B. 1561 and 2893, L. C. 419. Stem slender, erect, tapering, hairy. Flowers in loose panicles; branches not so distant as in *S. hirsuta*. Leaves round or kidney-shaped (*transversely ovate*), crenate or dentate, hairy on both sides, on *long*, narrow, tapering, channelled, hairy foot-stalks. Calyx strongly reflexed. Petals narrow, obovate or elliptical, faintly spotted. Capsule nearly cylindrical or slightly conical, with tapering divaricate tips, terminating in short, *not much divaricate*, straight styles. A smaller plant than *S. hirsuta*. Ireland. Perennial. June. Hibernian.

Var. *elegans*, Mack. E. B. 2892, L. C. 419 d. Leaves round, smooth, shining, sharply serrated. Panicle racemose. Capsule superior (free). Killarney. Perennial. June.

2. **S. hirsuta**, Linn. Hairy Oval-leaved Saxifrage. E. B.

2322, L. C. 420. Stem erect, tapering, hairy, leafless. Flowering branches alternate, distant, one-three-flowered. Leaves *ovate-roundish*, crenate-serrated, smooth, on semi-cylindrical, tapering, hairy stalks. Calyx reflexed. Petals elliptical. Styles and stigmas *much divaricated*. Hibernian. West and South of Ireland; very rare. Perennial. June.

Var. β . Leaves rounder, with sharper and deeper notches.

3. **S. umbrosa**, Linn. London Pride. E. B. 663 and 2892, L. C. 421. Reich. Icon. Bot. 841. Stem erect, like the two preceding. Flowers in loose panicles, branches long, alternate, two-three-flowered. Leaves in *dense rosettes*, obovate-roundish, with strong, sharp serratures, smooth, tapering gradually into dilated, *short*, hairy footstalks. Calyx reflexed. Petals spotted. Capsule ovate, with two tapering, divaricate lobes, each terminated by its acute style. Yorkshire and West of Ireland. Perennial. June.

A. 1, C. 1. Lat. 54° — 55° . Alt. 100—(?) yards. T. 47° (?).

Var. α . Leaves crenate. Yorkshire.

Var. β . Leaves serrate. Ireland.

Hibernian. Alien in Britain (?).

Pedicels of the above three species are hairy and glandular.

4. **S. Andrewsii**, Harv. Hooker's Journal 1848, 19. Andrew's Saxifrage. Stem round, slightly leafy, hairy, glandular in the upper part. Leaves *large, spathulate, nearly smooth, shining*, serrated; petioles concave and ciliated. Stem-leaves rudimentary toothed. Flowers in panicle clusters. Sepals linear-lanceolate reflexed, scarcely glandular. Petals large, linear, elliptical or oblong, beautifully marked with bright red spots. Ovary globular. Style short, divaricated. Ireland. Perennial. June.

5. **S. stellaris**, Linn. Starry Saxifrage. E. B. 167, L. C. 422. Stems several, erect, simple, branching only at the top, furnished with a few long, white hairs, leafless. Leaves *radical, oblong, cuneate at the base*, sharply toothed above the middle, obtuse, or shortly pointed. Flowers white, in a corymbose panicle. Sepals green, lanceolate, blunt. Petals ovate, with two yellow spots. Filaments subulate; anthers bright orange. Capsule cleft, with divaricated beaks.

Var. β . *integrifolia*, Hook. Leaves entire.

On mountainous rocks. Ingleborough, Yorkshire. β . Ben Nevis. Perennial. July.

A. 10, C. 25. Lat. 52° — 59° . Alt. 200—1450 yards. T. 45° — 32° .

6. **S. Hirculus**, Linn. Yellow Marsh Saxifrage. E. B. 1009, L. C. 424. Stems stout, erect, downy above, with barren, prostrate shoots. Leaves *lanceolate, flat*, entire, alternate; root-leaves tapering into a foot-stalk. Sepals fringed, blunt. Petals obovate, *yellow*, with red dots. Wet moors; very rare. Perennial. August.

A. 6, C. 7. Lat. 53° — 56° . Alt. 100—(?) yards. T. 47° —(?)

7. **S. hirta**, Linn. Hairy Alpine Saxifrage. E. B. 2291, L. C. 431*. Stems erect, branched, four-six inches high. Leaves (mostly radical or on the barren stems) three-five-cleft, ciliate, hairy, or woolly; stem-leaves mostly simple. Calyx broad, and rounded at the base,

glandular, with tapering, lanceolate teeth. Petals large, white, veined, obovate, obtuse. Stigmas on longish styles, elliptical, spreading. Fruit half-inferior. Kerry, Ireland. Perennial. July. Hibernian.

8. *S. caespitosa*, Sm. Tufted Alpine Saxifrage. E. B. 794. L. C. 432. Stems mostly solitary, erect, hairy, and viscid (some forms are rougher than *S. hirta*), two-four inches high. Root-leaves crowded, three- or five-cleft, fringed with soft hairs (only noticeable on young plants?). Stem-leaves few, three-cleft, or entire. Petals obovate, more rounded, and smaller, and the styles are also shorter, and the stigmas less dilated, than in *S. hirta*. Wales and Ireland, on lofty mountains. Perennial. May, June.

A. 2, C. 2. Lat. 56° — 58° . Alt. 1100—1300 yards. T. 34° .

Var. *β. incurvifolia*, E. B. 2909. Stem five-eight inches high, with five-six-nine flowers. *S. hirta* has rarely more than three flowers.

9. *S. affinis*, (Don.) Involute Alpine Saxifrage. E. B. 2903, L. C. 431*. Stem erect, one-three inches high, with simple, linear leaflets. Leaves of barren shoots three-five-lobed, with a broad, fringed base. Petals oblong, three-nerved, inflexed laterally. Ireland. Perennial. July.

This looks like No. 7 or No. 8.

10. *S. hypnoides*, Linn. Mossy Saxifrage. Lady's Cushion. E. B. 454, L. C. 431. Stems erect, nearly leafless, with long, procumbent, leafy shoots, which form large, mossy cushions in rocky, alpine places. Root-leaves three-five-cleft. Leaves of the shoots entire, *all acute, bristle-pointed and fringed*. Sepals ovate, pointed. Petals oblong. Mountains. Perennial. May—July.

The Fig. in E. B. 2276 represents *S. platypetala*, the stem of which is rather more leafy than the above-described form, and it bears larger and more rounded petals. It is the common form of this plant on Ben Lawers. *S. elongella*, E. B. 2277, has elongate, prostrate shoots. "These varieties are scarcely worth notice."—Mr. Babington.

A. 14, C. 30. Lat. 51° — 60° . Alt. 0—1300 yards. T. 47° — 34° .

Var. *latevirens*, Don. Bright-green Saxifrage. L. C. 431 f. Shoots very long and trailing. Leaves five-three-parted, with linear acute lobes. Sepals lanceolate, pointed. Petals spathulate, notched, or cleft. Mountains in Scotland. Perennial. June.

11. *S. pedatifida*, Ehrh., Sm. (?) Web-foot leaved Saxifrage. E. B. 2278, L. C. 432*. Stem wiry, branching almost from the base, reddish, hairy, with a few rudimentary, simple leaves; branches erect, long. Root-leaves on long stalks, hairy, and ciliated; leaves of the barren shoots tripartite; the outer lobes deeply cleft. Flowers white, in a *cymose panicle*. Calyx almost at the top of the ovary. Sepals short, triangular, spreading, with callous tips. Petals more than twice as long as the sepals, elliptical, white, with three green lines. Clova Mountains. Perennial. May, June.

The long-stalked root-leaves and the large umbel-like panicle of flowers may distinguish this plant.

A. 1, C. 1. Lat. 56° — 57° . Alt. 800—900 yards. T. 34° .

S. palmata, E. B. 455, looks like a reduced form of *S. pedatifida*.

§ 2. Calyx adhering to the ovary (half-inferior), segments erect, spreading, or recurved.

12. **S. aizoides**, Linn. Yellow Mountain Saxifrage. E. B. 39, L. C. 425. Stems three-five inches, succulent, reclining at the base, erect, leafy, round, hairy or glandular above. Leaves thick, linear-oblong, scattered, pointed, with a few marginal *cilia* (fringes). Flowers few, yellow. Calyx almost inferior. Sepals ovate, blunt, recurved. Petals narrow, obovate or oblong, yellow, spotted with reddish spots, sometimes notched, distant. Fruit widely divergent, surrounded at the base by a large disk. Wet, gravelly, or spongy places on mountains. Perennial. July—September.

Note.—This agrees better with *S. Hirculus* than with the species of this group.

A. 8, C. 20. Lat. 54°—60°. Alt. 0—1050 yards. T. 48°—36°.

13. **S. muscoides**, Wulf. Mossy Alpine Saxifrage. Sturm. 33.9 and 35.9. E. B. 2314, L. C. p. 16. Herbage glutinous. Stems erect, branching above, only two-three inches high, nearly leafless. Root-leaves in dense tufts, *linear*, blunt, *entire*, or trifid. Flowers buff-colour, on glandular peduncles. Petals oblong, obtuse, *scarcely longer than the calyx*. Perennial. May. "Said to have been found in Westmoreland."—Babington.

Var. *β. pygmæa*. Highlands of Scotland.

SECT. II.—Without barren shoots. Stems erect, leafy. Calyx attached to the ovary, spreading:

14. **S. tridactylites**, Linn. Rue-leaved Saxifrage. E. B. 501, L. C. 430. Stem erect, often branching at the base, with *glandular, viscid hairs*. Leaves slightly fleshy, the radical ones attenuated into petioles; the stem-leaves alternate, rarely opposite, sessile, *three-four-lobed*; lobes narrow; the upper leaves linear. Flowers small, in a forked, irregular cyme, on pedicels much longer than the calyx. Calyx united with the ovary, and crowning it when in fruit. On walls and roofs, and sandy places. Annual. March, April.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—300 yards. T. 51°—45°.

15. **S. granulata**, Linn. Granular-rooted or White Saxifrage. E. B. 500, L. C. 427. Root *with several small bulbs*, mixed with fibres. Stems solitary, erect, about a foot high, simple or branched, hairy, viscid, especially above. Lower leaves on long stalks, three-parted, with roundish or reniform divisions, and large blunt crenulations, tapering into a long channelled petiole. Upper leaves sessile, palmate, four-eight-lobed; floral leaves three-lobed or linear. Flowers large, white, in a terminal, few-flowered corymb. Pedicels of the *fruit very short*. Calyx united with the ovary only at its base. Perennial. April, May. Dry sandy places.

A. 14, C. 40. Lat. 50°—58°. Alt. 0—200 yards. T. 50°—46°.

16. **S. cernua**, Linn. Drooping-flowered Saxifrage. E. B. 664, L. C. 428. Stem erect or ascending, furrowed, hairy, leafy. Lower leaves five- upper ones three-lobed; lobes of the upper leaves more or less pointed, of the lower and root-leaves rounded (abruptly pointed).

Bulbs *axillary*, sometimes with rudimentary sepals. Petals always absent in the rudimentary flowers. Perfect flower solitary, terminal, white. Near the summit of Ben Lawers. Perennial. June—August.

A. 1, C. 1. Lat. 56° — 57° . Alt. 1250—1300 yards. T. 35° — 34° .

17. **S. rivularis**, Linn. Alpine Brook-Saxifrage. E. B. 2275, L. C. 429. Stems slender, flexuous, furrowed, hairy, branching, *without bulbs*. Root and lower leaves *all on long petioles*, three-five-lobed, lobes large, ovate. Stem-leaves sessile, ovate-oblong, entire. Flowers *terminal, solitary* (only one on its peduncle). Sepals (divisions of the calyx) ovate. Petals obovate, about as long as the sepals, scarcely so long as the ovary. Ben Nevis. Annual. June (?)—August.

A. 2, C. 3. Lat. 56° — 58° . Alt. 1000—1200 yards. T. 35° .

18. **S. nivalis**, Linn. Clustered Alpine Saxifrage. E. B. 440, L. C. 423. Stalks round, tapering, hairy, leafless, three-six inches high. Leaves all radical, in a rosette, obovate, cuneate at the base, *tapering into a broad petiole*, variously toothed. Calyx *half-embracing the ovary with its broad base*. Petals ovate. Capsule large, with recurved beaks. Ben Lawers, Snowdon. Perennial. July. This approaches some forms of *S. stellaris*, but it may generally be distinguished from that species by the broader calyx-base, and by the narrower greenish-white petals.

A. 4, C. 10. Lat. 53° — 58° . Alt. 650—1320 yards. T. 40° — 34° .

SECT. III.—Stems procumbent, and leaves opposite.

19. **S. oppositifolia**, Linn. Purple Saxifrage. E. B. 9, L. C. 426. Stems procumbent or suspended, leafy. Leaves thick, *obtusely or truncate*, ciliated, opposite, in *four rows*. Sepals fleshy, ciliated, like the leaves. Petals oblong, veined, red-purple. Subalpine rocks. Perennial. April, May. Plentiful on Penyghent; rare on Ingleborough, Yorkshire; rocks of Scottish mountains, not rare.

A. 7, C. 15. Lat. 52° — 61° . Alt. 0—1320 yards. T. 48° — 34° .

ORDER LXXXIII.—**UMBELLIFERÆ**, Juss. THE UMBELLIFEROUS FAMILY.

Herbaceous plants, often with conical fleshy roots. Stems usually hollow or with much pith, channelled or furrowed. Leaves alternate, usually much divided, with broad sheathing petioles. Flowers in general (compound) umbels, the rays of which are usually subtended by a series of whorled bracts (involucre), again separating into partial or ultimate umbels (umbellets), also usually subtended by a similar series of bracts (involucel). Calyx consisting (normally) of five sepals united in a tube, five-lobed, five-toothed, or obsolete. Petals five, inserted on the summit of the calyx-tube, usually inflexed. Stamens five, inserted with the petals. Ovary adherent, dicarpous, each carpel with one cell and one pendulous ovule. Styles two, persistent; one pointing to the circumference, the other to the centre of

the umbel, united at the base by a two-lobed disk, which crowns the ovary. Disk depressed, flat or conical (stylopod). Stigmas terminal. Fruit with two one-seeded indehiscent carpels (achenia, mericarps), usually separating when ripe, suspended from the top of a central column (carpophore). Carpels flat or concave on the sides, which are connected, each one furnished with five-nine ridges, more or less elevated (originating in the sepalous nerves and the junction of their margins). The five principal ridges are separated by furrows (valleculæ), containing resinous channels (vittæ), developed in the pericarp, from the summit to the base of the carpel, corresponding to the secondary ridges. Seed entirely and closely invested by the pericarp, rarely free, suspended. Embryo straight, very small near the hilum, in a corneous thick albumen. Radicle towards the hilum.



Fig. 177.—1, Part of branch and leaf of *Conium maculatum*; 2, umbel in fruit; 3, umbellet (partial umbel) in flower; 4, a single flower, enlarged, showing the petals and stamens; 5, fruit; 6, cross-section of the same, showing the involute albumen of the two seeds; 7, longitudinal section of one of the carpels, showing the minute embryo near the apex of the albumen.

DIVISION I.—Orthospermæ. Seed flat or convex on the side where the junction takes place (commissural).

TRIBE I.—Umbelliferae imperfectæ. Inflorescence anomalous. Flowers sessile or almost sessile, in heads, solitary or in vertical whorls, or in umbels.

SUB-TRIBE I.—Hydrocotyleæ. Flowers in solitary whorls, or in whorls above each other. Fruit without spikes or scales, compressed perpendicularly to the line of junction (commissural axis), lenticular, horizontal section linear, ridges distinct.

Genus.—*Hydrocotyle*.

I. Hydrocotyle, Linn. White-rot. Marsh Pennywort. Creeping herbs, usually in boggy, wet, or watery places. Leaves simple, stalked, roundish or kidney-shaped or peltate. Flowers ses-

sile, in one or more whorls, with few bracts, on naked peduncles, which are either solitary or fascicled in the articulations of the stem. Calyx absent.* Ovary round, compressed, ribbed, smooth. Styles permanent. Fruit two flat, roundish, three-ribbed carpels; marginal ribs indistinct.

H. vulgaris, Linn. Common White-rot. E. B. 751, L. C. 441. Stems slender (filiform), creeping, succulent. Leaves glabrous, on long petioles, roundish, peltate (with the petiole in or near the centre), with shallow notches, or very obtuse wide lobes. Flowers rather rarely developed, on slender naked stalks, very small, four-six in a whorled head. Fruit nearly didymous. Wet and marshy places. Perennial. July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—44°.

SUB-TRIBE II.—**Saniculeæ**. Flowers in capitules (heads), or in umbels. Fruit furnished with spines or scales, horizontal section roundish; ridges not distinct.

Genera.—*Sanicula*, *Eryngium*, *Astrantia*.

SYNOPSIS OF THE GENERA.

Sanicula. Leaves palmate, three-five-lobed; flowers sessile, terminal.

Eryngium. Leaves coriaceous, with decurrent segments and spinous lobes; flowers sessile, axillary.

Astrantia. Flowers in irregular umbels, and in regular umbellules.

II. **Sanicula**, Tournf. Sanicle. Perennials, with palmate leaves, and heads of white or roseate flowers. Flowers perfect, or intermixed with barren flowers, sessile, on a chaffy receptacle, with an involucl of several bracts. Petals and stamens inflexed. Fruit hemispherical, with indistinct ridges, and subulate hooked spines, surmounted by the enlarged lanceolate lobes of the calyx.

S. europæa, Linn. Wood Sanicle. E. B. 98, L. C. 442. Root vertical, with fleshy fibres. Stems simple, slender, grooved, glabrous, erect, naked, or with one or two leaves when the plant is luxuriant. Leaves mostly radical, in a rosette, on long petioles, leathery, glabrous, shining, palmate, with large incised or toothed lobes, which are terminated by a rigid bristle. Most of the flowers barren. Rays of both general and partial umbels much elongated after flowering. Fruit densely covered with long hooked prickles, crowned by the spreading styles. Moist woods. Perennial. May, June.

A. 17, C. 75. Lat. 50°—59°. Alt. 0—350 yards. T. 50°—44°.

III. **Eryngium**, Tournf. Eryngo. Sea Holly. Perennial plants, with pinnate or bipinnate, coriaceous leaves, and pale blue or whitish flowers. Bracts of the involucre leaf-like, spinous, subtending

* In the following descriptions the ordinal character of the petals, viz., obcordate or obovate, with an inflexed point, will not be repeated in the generic diagnostics. When the petals vary from the normal character they will be described.

the compact, many-flowered head of flowers, which are arranged on a cylindrical receptacle. Calyx-lobes leaf-like, terminating in spines. Fruit obovate-oblong. Carpels semi-cylindrical, with indistinct ridges and imbricated scales, crowned by the persistent calyx.

1. **E. maritimum**, Linn. Sea Holly. E. B. 718, L. C. 444. Stems spreading, erect, or ascending, hoary, branched. Root-leaves on long round stalks, roundish, truncate at the base, with large spinous lobes, somewhat plaited; stem-leaves sessile or clasping, cuneate at the base, lobed or toothed; all spinous. Bracts of the involucre large, spreading, *three-lobed, spinous*. Flowers blue, in dense, *ovate, sessile heads*. Fruit spinous, crowned with the persistent prickly calyx. Sandy sea-shores. Perennial. July, August.

A. 16, C. 30. Lat. 50°—57° (61°). Alt. 0. T. 52°—47°.

2. **E. campestre**, Linn. Field Eryngo. E. B. 57, L. C. 445. Stem one-two feet high, stout, glabrous, beautifully marked with white and green lines (stripes). Leaves glaucous; the root-leaves *pinnate or bipinnate*, with decurrent, toothed, or pinnatifid segments, both segments and teeth terminating in strong spines. Upper leaves nearly sessile and amplexicaule (clasping the stem). Heads numerous, *nearly globular*, in terminal corymbs. Bracts of the involucre *linear-lanceolate*, with spinous teeth much longer than the flowers. Fruit covered with white scarious scales. In dry stony places. Devonshire and Norfolk. Perennial. July—September.

A. 5? Alien?

IV. Astrantia, Tournf. Starwort. Perennials. Radical leaves petiolate; cauline leaves sessile. Umbel irregular, of five rays. Umbellule (umbellet) regular. Involucre of many bracts. Calyx-limb with leafy lobes. Petals oblong-obovate, with a long lobe. Fruit slightly compressed. Carpels almost adnate, with five elevated, plicate, dentate, inflated ridges, with smaller corresponding ridges under the former.

A. major, Linn. Greater Astrantia, or Starwort. L. C. 443. Stems erect, hollow or full of pith, glabrous, striated. Lower leaves five-seven-parted; upper ones three-parted, on very leafy, sheathing petioles; lobes oblong, acute, cleft, or toothed; teeth terminating in long bristly points. Involucre of many white scarious bracts, with green sharp-pointed tips, rather longer than the simple umbel. Mr. Borrer considers this plant to have been naturalized for ages above Stokesay Castle, near Ludlow. Perennial. June, July.

Alien.

TRIBE II.—Cicuteæ. Umbels compound, very rarely reduced to lateral partial umbels. Fruit nearly cylindrical or compressed perpendicularly to the axis. Carpels without spines, five primary ridges equal, or nearly so, rarely winged.

SUB-TRIBE I.—Ammineæ. Fruit flattened perpendicularly to the axis, often almost two-lobed; horizontal section oblong.

Genera.—*Bupleurum*, *Trinia*, *Sison*, *Cicuta*, *Ægopodium*, *Carum*, *Petroselinum*, *Apium*, *Helosciadium*, *Sium*, *Pimpinella*, *Bunium* (*Conopodium*).

SYNOPSIS OF THE GENERA.

Bupleurum. Leaves entire, coriaceous, glaucous; flowers yellow, with a many-leaved involucl.

Trinia. Leaves bi- or tripinnate; involucre and involucl absent, or almost none.

Sison. Leaves pinnate, with lobed segments; involucre and involucl with few bracts.

Cicuta. Leaves tripinnate; involucre none, involucl with many bracts.

Ægopodium. Leaves ternate; no involucre nor involucl.

Carum. Leaves bi- or tripinnate; involucre and involucl usually with several or many bracts, rarely wanting.

Petroselinum. Leaves pinnate or bi- or tripinnate; involucre with one-three entire leaflets, involucl with few or many bracts.

Apium. Whole herbage aromatic; involucre and involucl wanting.

Helosciadium. Aquatics, with stems more or less rooting; leaves pinnate, or the submersed leaves bi- or tripinnate, with capillary segments.

Sium. Leaves pinnate; involucre and involucl of several leaflets (bracts).

Pimpinella. Leaves pinnate, rarely bipinnate; no involucre nor involucl.

Bunium (*Conopodium*). Leaves bi- or tripinnate; no involucre nor involucl.

V. *Bupleurum*, Linn. Hare's-ear. Thorow-wax. Herbaceous or shrubby plants, with simple, undivided, quite entire leaves. Umbels simple or compound. Partial involucre always, general ones sometimes present. Calyx absent. Fruit ovate, slightly compressed, crowned with the very short permanent styles. Carpels somewhat cylindrical, with five prominent acute ribs, with flat interstices. No vittæ.

1. ***B. tenuissimum*, Linn.** Slender Hare's-ear. E. B. 478, L. C. 466. Stems much branched, branches very slender, spreading, slightly furrowed, or striated, *smooth*, *wiry*, rigid. Leaves simple, linear-lanceolate, acuminate, sessile. Umbels *simple*, axillary and terminal, arranged in panicles, often nearly sessile, *three-five-flowered*, with long involuclal bracts. Carpels round, ridged and granular. Salt marshes. Annual. August, September.

A. 7, C. 15. Lat. 50°—55°. Alt. 0—100 yards. T. 51°—47°.

2. ***B. falcatum*, Linn.** Sick-leaved Hare's-ear. E. B. 2763, L. C. 468. Stems erect, branching, zigzag, smooth, furrowed, two-four feet high. Lower leaves oblong, tapering below; the upper linear-lanceolate, pointed, simple, entire, smooth, sessile. Umbels *compound*, lateral and terminal, five-ten-rayed; bracts oblong, with tapering points, those of the partial umbels nearly *as long as the flowers*. Fruit about as long as the pedicel, smooth, with prominent

ridges and concave interstices, crowned with the enlarged disk. Near Ongar, Essex. Naturalized (?). Alien. Perennial. August.

3. **B. aristatum**, Bartl. Awned-leaved Hare's-ear. *B. odontites*, Sm., not Linn. E. B. 2468, L. C. 467. Stem branching, glabrous, only a few inches high (eighteen inches). Leaves linear-lanceolate, pointed, sessile. Umbels *compound, terminal, two-three-rayed*, subtended by three-four large, prominent, five-nerved elliptical bracts, *which are longer than the umbels*; bracts of the involucre three-nerved, similar, smaller, all sharply pointed (acuminate and awned). Fruit on short equal pedicels, with very slender ridges and smooth interstices. Devonshire and Channel Islands. Annual. July, August.

At Wandsworth steam-boat pier, this plant has occurred upwards of eighteen inches long, branching from the base.

A. 1, C. 2. Lat. 50°—52°. Alt. ? T. 52°—50°.

B. Sp. No. 1 (?). Whole plant stouter and more spreading than *B. aristatum*. Stems and branches flexuous, not leafy. Leaves linear, not so long nor with so long points as the preceding. Umbels compound, *with numerous rays*, much longer than the few bracts by which the rays are subtended. At Wandsworth steam-boat pier. Annual (?). August.

Scarcely differs from the Essex forms of *B. falcatum*, but is rather more spreading, and the stem and branches are not leafy as in No. 2.

B. protractum, Link and Hoffm. Rechb. Ic. Cr. ix. 824. This form or species was long confounded with *B. rotundifolium*, from which indeed it is not separated by very distinct or obvious marks. Leaves *ovate-oblong*, perfoliate, elongate; umbellets small and *nearly sessile*. Annual. July.

Note.—The stem is more inclined to ramify than in *B. rotundifolium*, and it is not nearly so leafy. Wandsworth steam-boat pier, as above, growing with great numbers of exotic plants. Annual. July.

4. **B. rotundifolium**, Linn. Round-leaved Hare's-ear. E. B. 99, L. C. 469. Stem erect, *simple*, quite smooth, leafy. Leaves oval-roundish, mucronate, perfoliate, glaucous, quite smooth. Rays four-eight, without any general involucre. Partial involucre (involucre) with five very unequal, ovate, shortly pointed bracts. *Florets on very short stalks*, spreading, with greenish-yellow, involute petals. Stigma flat, discoid. Chalky corn-fields. Rare. Annual. June, July.

A. 8, C. 25. Lat. 50°—55°. Alt. 0—100 yards. T. 51°—48°.

VI. **Trinia**, Hoffm. Honewort. Biennial, branching plants. Stem angular. Leaves bipinnate, with triternate segments and linear lobes. Umbels many-rayed, in a panicle or thyrses. Dioecious by abortion. Calyx-limb obsolete. Fruit ovate. Carpels with five equal and prominent ridges. Interstices with single vittæ or none. Carpophore two-parted. Seed convex, gibbous.

T. glaberrima, Hoffm. *Pimpinella dioica*, Sm. Dwarf Burnet Saxifrage. E. B. 1209. *T. vulgaris*, L. C. 453. Root tapering, fleshy, crowned with the remains of decayed leaves. Stems chan-

nelled, angular, smooth, much branched, branching from the base. Leaves bi-tri-pinnate, with glaucous green, linear entire, or cleft segments. Umbels of the fertile plant two-five-rayed; rays unequal, spreading; those of the barren plants compact, without involucre. Fruit elliptical, ovate. On dry limestone hills, Somersetshire. Perennial. May, June.

A. 2, C. 3. Lat. 50° — 52° . Alt. 0. T. 52° — 50° .

VII. Sison, Linn. Honewort. Biennial plants, with erect stems, tapering, paniced branches. Segments of the lower leaves toothed or incised, those of the upper linear, many-cleft. Bracts of the involucre and involucel few. Calyx-limb obsolete. Styles very short. Fruit ovate, laterally compressed. Carpels with five filiform equal ridges, the lateral ones at the margin. Interstices with one *vitta*. Commissure with two short clavate *vittæ*. Carpophore cleft. Seed gibbous.

S. Amomum, Linn. Hedge Honewort. E. B. 954, L. C. 456. Stem erect, branching, finely striated, glabrous. Leaves pinnate, with ovate-oblong leaflets, which are incised or toothed. Umbels on few rays (three-five). Umbellets few-flowered, on very unequal pedicels. Bracts of the involucre linear entire, rarely cleft; bracts of the involucel linear-lanceolate. Flowers small, white. Damp chalky and gravelly places. Biennial. July, August.

A. 12, C. 40. Lat. 50° — 56° . Alt. 0—200 yards. T. 51° — 47° .

VIII. Cicuta, Linn. Water-Hemlock. Cowbane. Aquatic, perennial, fetid plants. Leaves simply or doubly ternate, with sharply serrated, acute, smooth leaflets. Umbels terminal and axillary, with partial and sometimes general involucre. Bracts linear. Calyx membranous; sepals somewhat unequal, acute, permanent. Fruit nearly round, crowned with the calyx and styles. Carpels nearly hemispherical, with three broad, flattened, dorsal ribs, and two similar marginal ones, with a resinous channel in the interstices.

C. virosa, Linn. Common Water-Hemlock. E. B. 479, L. C. 449. Stems round, quite hollow, striated, or slightly furrowed, glabrous. Lower leaves on long, fistular petioles, bipinnate; lower leaflets mostly three-parted, with lanceolate, narrow, long, acutely-toothed divisions, upper ones two-parted, terminal ones three-parted; upper leaves on shorter, sheathing, not hollow petioles, ternate or biternate, with narrow, elongated, sharply serrated leaflets. Umbel many-rayed, without an involucre. Bracts of the involucel short, linear, entire. In ponds. Rare. Perennial. July.

A. 14, C. 30. Lat. 51° — 57° . Alt. 0—200 yards. T. 50° — 47° .

IX. Ægopodium, Linn. Goat's-foot. Herb-Gerarde. Roots creeping, perennial. Leaves ternate or biternate, with broad-pointed, serrated leaflets. Umbels axillary and terminal, with no involucre nor involucels. Calyx obsolete. Fruit elliptic, slightly compressed, crowned with the conical stylopod and the reflexed styles. Carpels

oblong, with five filiform ridges, without vittæ. Fruit rarely perfect; a common case in plants that increase much by their roots. Seeds, when present, convex, tapering.

Æ. Podagraria, Linn. Common Gout-weed. E. B. 940, L. C. 457. Root creeping extensively. Stems robust, hollow, furrowed, glabrous, leafy. Leaves pinnate, with acuminate ovate or lanceolate, unequally-toothed, somewhat acutely-serrated leaflets; lower leaves on very long petioles; the upper leaves only three-cleft. Umbels many-rayed. Petals pure white. Common about towns and villages; in waste, shady places. Perennial. June.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—150 yards. T. 51°—45°.

X. Carum, Linn. Caraway. Biennial, smooth plants. Leaves bipinnate. Segments much divided. Limb of calyx obsolete, or very minute. Fruit ovate or oblong, with a depressed stylopod and deflexed styles. Carpels oblong or linear-oblong, with five filiform ridges, the two lateral marginal. Interstices with one *vitta*. Commissure with two *vittæ*. Carpophore free, forked at the top. Seed tapering, convex.

1. **C. Carui**, Linn. Caraway. E. B. 1503, L. C. 458. Root tapering, fusiform (like a spindle). Stem erect, furrowed, smooth, branching from the base, leafy; branches erect. Leaves *tripinnate*; ultimate segments linear, setaceous, pointed. Rays numerous, unequal; involucre and involucrel absent, or one or two bracts united at their base. Petals nearly equal, notched, or obcordate. Carpels greyish-brown, very aromatic. Biennial. June.

Cultivated, or an escape from cultivation?

Alien?

2. **C. verticillatum**, Koch. *Sium*, Sm. Whorl-leaved Meadow-Parsnip. E. B. 395, L. C. 459. Stem erect, rather slender, furrowed, smooth, with erect branches. Leaves pinnate; leaflets opposite, divided to the base into numerous linear-capillary segments, forming a series of apparent whorls; these apparent whorls are numerous, increasing upwards from the base to the apex. Umbels terminal, with numerous equal rays, and an involucre of several short, linear-lanceolate, scarious-edged bracts; bracts of the involucrel similar to those of the involucre. Damp, hilly pastures, in the West of Scotland and Ireland. Perennial. August.

A. 5, C. 15. Lat. 51°—57°. Alt. 0—200 yards. T. 49°—46°.

3. **C. Bulbocastanum**, Koch. E. B. 2862, L. C. 460, 461, 3rd edition. Bracts always present. Umbels many-rayed. Fruit short, abrupt, with reflexed styles. Chalky fields. Herts and Cambridge.

A. 2, C. 4. Lat. 51°—53°. Alt. 0—100 yards. T. 48°.

XI. Petroselinum, Hoffm. Parsley. Biennial, branching, smooth plants. Leaves decompose, with cuneate lobes. Involucre with few, the involucrel with many bracts. Flowers greenish-white, uniform. Calyx-limb obsolete. Fruit ovate, crowned with the conical stylopod and the diverging styles, contracted laterally. Carpels with

five equal, filiform ridges, and solitary vittæ. Commissure with two vittæ. Carpophore two-parted. Seed convex, gibbous.

1. *P. sativum*, Hoffm. Common Parsley. L. C. 451. Stems erect, stout, furrowed, hollow, glabrous, branching. Leaves bipinnate, shining, with ovate, trifid leaflets, more or less incised or toothed; lower leaves on long petioles; upper ones sessile, with linear, entire segments. Flowers greenish-yellow, terminal, in many-rayed umbels. Bracts of the involucre one-two, linear pointed; bracts of the involucre several, linear lanceolate. Fruit crowned with a turgid disk. Partially naturalized in chalk pits and on old walls. Annual or biennial. July.

Alien. A. 7.

2. *P. segetum*, Koch. Corn Parsley. E. B. 228, L. C. 452. Stems rigid, striated, glabrous, branching, spreading. Root-leaves *pinnate, with ovate-oblong*, toothed or incised leaflets; upper stem-leaves very much reduced in size and number, or with the petiole only developed. Umbels very unequal, the lateral ones reduced to umbellets. Bracts two-five. In stony places and in fields. Not common. Annual (?) or biennial. July—September.

A. 5, C. 20. Lat. 50°—53°. Alt. 0—100 yards. T. 51°—48°.

XII. *Apium*, Linn. Celery. Perennial aquatic. Root enlarged at the collar. Stem sulcate, branching. Leaves decomposed, with cuneate segments. Umbels axillary or terminal. Involucre and involucre absent. Calyx-limb obsolete. Fruit roundish. Stylopod depressed. Carpels, vittæ, ridges and seed as in *Petroselinum*.

A. graveolens, Linn. Wild Celery. E. B. 1210, L. C. 450. Stem erect, furrowed, branched, two-three feet high. Leaves ternate, with large, cut, wedge-shaped leaflets. Umbels sessile, lateral, many-rayed. Flowers white. Tidal rivers and salt-water ditches. Common. Perennial. July, August.

A. 18, C. 30. Lat. 50°—56°. Alt. 0. T. 52°—48°.

XIII. *Helosciadium*, Koch. Marshwort. Aquatics, either creeping or prostrate, with axillary and terminal umbels. Calyx-limb five-toothed or obsolete. Fruit compressed perpendicularly to the commissure (line of junction). Carpels oblong, with five filiform, equal, elevated ridges, with solitary vittæ. Carpophore (column) entire, free. Seed gibbous.

1. *H. nodiflorum*, Koch. *Sium nodiflorum*, Linn. Procumbent Marshwort. E. B. 639, L. C. 454. Stems prostrate and rooting at the base, usually robust, hollow, glabrous. Leaves pinnate, on long petioles. Leaflets *ovate-lanceolate*, sessile, opposite, and horizontal, not in the same plane as the common petiole, sharply serrated, shining. Umbels on short peduncles or sessile, four-eight-rayed, without an involucre. Involucre consisting of about six membranous, lanceolate bracts, each with a scarious margin, nearly or quite as long as the umbellet. Grassy ditches; marshy meadows.

A. 15, C. 60. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—48°.

Var. *B. intermedium*. Stems slender, prostrate, and rooting; umbels sometimes with a peduncle. Ditches; not uncommon. Intermediate between the above species and the following.

2. *H. repens*, Koch. Prostrate Water-Marshwort. E. B. 1431, L. C. 454 b. Stems prostrate, rooting, glabrous, striated, hollow, leafy. Leaves pinnate. Leaflets sessile, *ovate-roundish*, or *oblong and cuneate* at the base, crenulate, or toothed; terminal leaflets three-lobed, with rounded, crenate lobes, or entire and roundish. Umbels lateral, all more or less peduncled. General involucre wanting, or but one bract. Partial involucre of several concave, striated bracts. Fruit ribbed, crowned with the divergent styles. Meadow between Walham Green and Little Chelsea, where *Cyperus fuscus* grows.

Area as in No. 1?

3. *H. inundatum*, Koch. Least Water-Marshwort. L. B. 227, L. C. 455. Stems usually submersed, variable in length, sometimes prostrate and rooting, slender, glabrous. Submersed leaves *bi-tripinnate*, with *elongate, capillary segments*; aerial leaves pinnate, with incised segments. Umbels pedunculate, two-three-rayed, without an involucre. Pools, on commons and turfy bogs. Not rare. Perennial. May—July.

A. 18, C. 70. Lat. 50°—60°. Alt. 0—250 yards. T. 51°—44°.

XIV. *Sium*, Linn. in part. Water-Parsnep. Perennial plants, with pinnate leaves and white flowers. Bracts of the involucre and involucrel entire or incised. Calyx-teeth short. Fruit compressed, or nearly didymous. Carpels oblong, with five filiform ridges. Styles filiform (cylindrical). Resiniferous channels (vittæ) several. Column bipartite, the divisions usually united with the carpels.

1. *S. latifolium*, Linn. Broad-leaved Water-Parsnep. E. B. 204, L. C. 464. Stems erect, stout, hollow, with prominent, acute angles, and concave, furrowed or striated sides, branching above, glabrous. Leaflets rounded at the base, *lanceolate, finely and regularly toothed and serrated*; teeth with a sharp point; leaflets of the lower leaves sometimes incised or pinnatifid; of the upper serrated, linear-lanceolate. Rays of the umbel numerous. Bracts of the involucre and involucrel *linear, entire*. Fruit with a very thin pericarp. Ditches in marshy meadows. Rare. Perennial. July.

A. 12, C. 30. Lat. 50°—56°. Alt. 0—100 yards. T. 50°—47°.

2. *S. angustifolium*, Linn. Narrow-leaved Water-Parsnep. E. B. 139, L. C. 465. Stems round, hollow, grooved or furrowed, branched, glabrous, leafy. Leaflets ovate, or ovate-oblong, *more or less incised*; the lower on long stalks, the upper sessile. Rays numerous, on short peduncles. Bracts of the involucre *leaf-like, incised*; those of the involucrel *incised or toothed*. Styles enlarged on a hemispherical or conical base. In ditches and other watery places. Perennial. July—September.

A. 14, C. 40. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

Sub-var. *gracile*. Plant slender; segments of the leaves not so deeply cut; bracts entire or scarcely incised.

XV. **Pimpinella**, Linn. Burnet Saxifrage. Rigid, perennial, pungent, and aromatic plants. Leaves pinnate, with finely-cut leaflets. Umbels compound, without involucre. Calyx none (obsolete). Fruit ovate, compressed, crowned with the long, capillary, permanent styles. Carpels linear-oblong, with five filiform ridges and several resiniferous channels.

1. **P. magna**, Linn. Large Burnet Saxifrage. E. B. 408, L. C. 463. Roots tapering. Stems erect, *angular, furrowed*, branching, glabrous or downy. Leaves pinnate, ovate or ovate-lanceolate, broad, deeply toothed or incised, with a three-lobed terminal leaflet; lower leaves on long petioles, the upper ones on short, sheathing petioles; the uppermost reduced to an enlarged petiole. Rays of the umbel eighteen, nearly equal. Petals oblong, notched, equal. Fruit smooth. Moist places, in meadows, by riversides, &c. Perennial. July, August.

A. 8, C. 25. Lat. 50°—55°. Alt. 0—200 yards. T. 50°—47°.

A glabrous variety, with oblong segments, serrated with angular teeth, grows about York.

2. **P. Saxifraga**, Linn. Common Burnet Saxifrage. E. B. 407, L. C. 462. Stems *round, finely striated*, branching, glabrous, or slightly hairy. Leaflets roundish, ovate, or oblong, toothed or incised, sometimes divided into linear lobes, the terminal lobe being three-cleft; segments of upper leaves narrower, deeply incised, *usually reduced to a broad petiole*. Rays many, almost equal. Fruit smooth. Dry pastures, &c. Perennial. June—October.

A very variable species.

A. 18, C. 80. Lat. 50°—59°. Alt. 0—700 yards. T. 52°—41°.

Var *β. dissecta*, Thuil. Leaves deep green, sometimes blackish, and with linear, more or less curved segments. "Flore Par." p. 174.

XVI. **Bunium**, Linn. Earth-Nut, Pig-Nut, Kipper-Nut. Roots tuberous. Stem erect, slender, leafy. Leaves bipinnate, with very narrow, smooth segments. Umbels compound, with parted involucre. Calyx often obsolete. Styles *much swollen at the base*, permanent. Fruit contracted at the sides, linear, oblong, crowned with the calyx, if present, and the depressed (rarely conical) stylopod. Carpels with three slightly elevated, distant ribs, most conspicuous at the summit, and one-three vittæ. Carpophore bifid. Seed tapering, convex, face plane.

B. flexuosum, With. Earth-Nut or Pig-Nut. E. B. 988, L. C. 461, 460 in 3rd ed. Roots fleshy, roundish, sometimes aggregate, and forming a large, knobby, shapeless lump. Stem slender, flexuous, naked below, leafy and branching near the top. Root-leaves on long petioles, usually decayed before the plant flowers; stem-leaves sessile; segments narrowly linear-pointed. Rays of the umbel numerous, nearly equal. Involucre only a single bract, or altogether absent. Sandy fields, woods, and pastures. Corn-fields are, in some parts,

white with the flowers of this plant, and the roots are often as large as a goose-egg. Perennial. June, July.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—450 yards. T. 51°—42°.

B. *Bulbocastanum*, Linn., (*Conopodium*) Koch. See *ante*, under *Carum*, p. 585.

SUB-TRIBE II.—Seselineæ. Fruit almost cylindrical, or somewhat four-angled, rarely nearly globular; horizontal section round, or almost round.

Genera.—*Æthusa*, *Cenanthe*, *Libanotis*, *Ligusticum*, *Fœniculum*, *Silaus*, *Meum*, *Crithmum*.

SYNOPSIS OF THE GENERA.

Æthusa. Leaves bi-tripinnate; involucre wanting; bracts of the involucre unilateral, reflexed.

Cenanthe. Aquatic or semi-aquatic plants. Leaves pinnate, or bi-tripinnate; involucre none, or with many bracts; involucre with several bracts.

Libanotis. Leaves bipinnate; involucre with several bracts.

Ligusticum. Leaves biternate; involucre and involucre present.

Fœniculum. Leaves bi-quadrupinnate, with capillary segments; flowers yellow.

Silaus. Leaves bi-tripinnate; involucre none—two leaflets; involucre with several bracts.

Meum. Herbage aromatic; leaves setaceous; involucre and involucre present.

Crithmum. Leaves fleshy; involucre and involucre present.

XVII. *Æthusa*, Linn. Fool's Parsley. Root annual. Leaves bi-tripinnate. General bracts wanting; partial bracts unilateral. Fruit ovate, roundish, crowned by the stylopod and reflexed styles. Carpels hemispherical, with *five prominent, thick ridges*. Column two-parted.

Æ. *Cynapium*, Linn. Dog's Parsley, Fool's Parsley. E.B. 1192, L.C. 475. Stems erect, branched, round, polished, beautifully striated, usually glaucous. Leaves deep green, with rhomboidal-triangular (cuneate) segments and incised lobes. Bracts of the involucre usually three, linear, deflexed and unilateral. A weed. In gardens, fields, &c. Annual. July—October.

A. 16, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.



Fig. 178. — Fruit of *Æthusa Cynapium*; *st*, style; *stp*, stylopod.

XVIII. *Cenanthe*, Linn. Water-Dropwort. Biennial or perennial, often aquatic or marsh plants. Stems furrowed, branching, leafy, sometimes tumid at the joints. Leaves compound, more or less divided. Flowers in terminal or lateral umbels, which are either sessile or stalked. Involucral bracts often wanting; those of the umbellets numerous, narrow. Calyx conspicuous; sepals leaf-like,

acute, permanent. Fruit oblong or ovate, crowned with the dilated or depressed base of the styles. Carpels five-ribbed, with intermediate vittæ, and with a more or less spongy, corky bark.

SECT. I.—*Enanthe*. Radical fibres usually tuberous; barren flowers pedicelled; fertile flowers sessile.

1. *Æ. fistulosa*, Linn. Common Water-Dropwort. E. B. 363, L. C. 470. Root of several fleshy fibres. Stems twelve-eighteen inches high, hollow, finely striated, *nearly simple*. Root-leaves bi-tripinnate, on long petioles; segments very small, linear; stem-leaves pinnate, with linear, entire, or two-three-cleft segments; *petioles hollow, and longer than the leafy part*. Partial involucre (involucel) consisting of numerous linear entire bracts. Umbels on long peduncles, usually with three rays; umbellets on short stalks, many-flowered; the outer florets only fertile. Calyx in five linear lanceolate deep divisions. Fruit turbinate, four-angled. Grassy margins of ponds. Perennial. July.

A. 16, C. 80. Lat. 50°–58°. Alt. 0–200 yards. T. 51°–47°.

2. *Æ. silaifolia*, Bieb. (?) *Æ. peucedanifolia*, Poll., Coss. and Ger., 212. Silaus-leaved Dropwort. E. B. 348, L. C. 472. Root tuberous, tubers oblong. Stem furrowed, branching above. Root-leaves bi-tripinnate, on long stalks; stem-leaves *bipinnate*, segments linear, entire, or cleft. Umbel *five-ten-rayed*. Flowers of the circumference larger than those of the disk. Involucre usually none, or reduced to a single leaf. Bracts of the involucel linear, entire. Fruit oblong, crowned with a broad lacinated or lacerated disk, and the deflexed styles. The fruit is smooth, with narrow ridges, green, crowned with an expanded flat disk, over which the persistent deflexed styles are laid, and they exceed the breadth of the disk. Perennial. June.

A. 6, C. 10. Lat. 50°–53°. Alt. 0–100 yards. T. 50°–48°.

Note.—The almost sessile fruit, in a close hemispherical head, is a generic character of all the British species (?) of this section. In this species the fruit is crowned by the enlarged teeth and rim of the calyx, and by the slender, elongated, divaricate styles. (Is not this a generic character? Can any reliable specific characters be derived from the form of the fruit?*) The calycine teeth of *Æ. fistulosa* when in fruit are slenderer and more elongate than in *Æ. silaifolia*, and the styles in the former are longer than in the latter. The above description is that of examples collected in Battersea Fields, and kept alive in the garden during several years (from 1852 to 1857). (Comp. "Phytologist," vol. iii., p. 48.)

3. *Æ. pimpinelloides*, Linn. Parsley Water-Dropwort. Jacq. 394, L. C. 471. Root fibrous, with several ovate or roundish fleshy knobs. Stem erect, round, furrowed, smooth, hollow, leafy, one-three feet high. Root-leaves bipinnate, with elliptical, entire or notched, or

* Eminent botanists (see Babington's "Manual," 2nd edition) assert that the identity of *Æ. peucedanifolia*, Poll., and *Æ. silaifolia*, Bieb., cannot be determined without ripe fruit of the English plant.

incised mucronate segments. Stem-leaves pinnate, with linear, acute, flat leaflets; uppermost quite simple, only a dilated petiole. Umbels many-rayed, with many linear bracts (each ray subtended by a bract?). Umbellets (partial umbels) dense, subtended by bracts as long as the rays. Fruit nearly quadrangular, with prominent angles, smooth, on very short pedicels, rather longer than the slightly diverging persistent styles. Salt marshes (?). Gloucestershire, Hants, &c. In dry spots in the Isle of Wight, as at Upton, near Ryde. Perennial. July—September.

A. 4, C. 8. Lat. 50° — 53° . Alt. 0—100 yards. T. 51° — 48° .

4. *Æ. Lachenalii*, Gmel. E. B. 347, L. C. 471*. Root furnished with several long cylindrical tubers. Stems erect, slender, grooved, hollow, alternately branched, three-four feet high. Root-leaves often decayed before flowering, bipinnate, with obovate or oblong incised, often three-lobed segments. Stem-leaves bipinnate, with narrow, linear segments. Umbel about twelve-rayed, with a few deciduous, setaceous bracts. Umbellets many-flowered, very compact, outer flowers about the same size as the inner ones. Bracts of the involucre linear-lanceolate, short. Petals cleft. Fruit oblong, nearly four-angled. Styles about half as long as the fruit; the latter is elliptical cylindrical, crowned with the spreading teeth of the calyx, and with the long, nearly straight styles. Salt marshes; not unfrequent. Perennial. July.

A. 15, C. 50. Lat. 50° — 57° . Alt. 0—200 yards. T. 52° — 47° .

Note.—In all the specimens of these three species that I have seen, the umbels and umbellets appear to afford distinctive characters. In *Æ. pimpinelloides* the rays of the umbel are few, short, and stout, and the umbellets are composed of dense capitate aggregations of florets and fruit. In *Æ. peucedanifolia* the rays are more numerous, longer, and nearly as stout as in No. 3, and the florets are more numerous. In *Æ. Lachenalii* the rays are numerous, slender, and elongate, and the umbellets are not so dense, or the florets are on longer pedicels.

5. *Æ. crocata*, Linn. Water Hemlock. E. B. 2313, L. C. 473. Stem erect, stout, furrowed, branched, usually exuding a fetid yellow juice. Leaves tripinnate, with dilated, cuneate-ovate, cut leaflets. Involucre of few bracts. Riversides; common. Perennial. July.

A. 16, C. 50. Lat. 50° — 58° . Alt. 0—200 yards (?). T. 52° — 46° .

Var. *Æ. apiifolia*. Whole plant slenderer, and without the yellow juice of the typical form. North Wales, near Dolgelly, on a hill above Sir — Vaughan's; more than 200 yards above the coast-line (?).

SECT. II.—*Phellandrium*. Radical fibres filiform (not tuberous); flowers of the umbellules all pedicelled; fruit more or less distant.

6. *Æ. Phellandrium*, Lam. Fine-leaved Water-Dropwort. E. B. 684, L. C. 474. Stems very thick and hollow below, often reclining and rooting at the base, flexuous or zigzag, with numerous spreading branches, glabrous or slightly rough, furrowed or striated.

Leaves tripinnate; segments (leaflets) *divaricated*, ovate, deeply cut into very *small oblong, entire, or incised lobes*; lower leaves sometimes submersed, and with *capillary segments*. Umbels lateral or terminal, sometimes on short stout stalks, or nearly sessile, six-nine-rayed, without an involucre. Bracts of the involucre linear lanceolate. Fruit ovate-oblong. Ponds, ditches. Perennial(?). July.

A. 13, C. 40. Lat. 50°—56°. Alt. 0—100 yards. T. 50°—47°.

Note.—The finely-divided leaves of this species form exquisitely beautiful objects. It will grow in the garden, and it forms a neat rounded tuft of stems, branches, and leaves.

7. ***C. fluviatilis***, Colem. River Water-Dropwort. L. C. 474*. Stem floating. Leaves bipinnate, with simple or pinnatifid leaflets (the segments of the stem-leaves are broader, and not so fine and elegant as in the preceding). Segments of the submersed leaves *cuneate*, incised, pellucid, with many parallel nerves. Umbels lateral, opposite to the leaves. Fruit broad, elliptical. Streams in chalky districts, Hertford. A plant was taken out of the New River-head, Clerkenwell, London. Are the florets pedicelled? Biennial or perennial(?). July—September.

Area and Lat. undetermined. T. 49°—48°.

XIX. ***Libanotis***, Crantz. Mountain Stone-Parsley. Ultimate segments of the leaves ovate, incised, or much cleft, often decussated. Bracts of both involucre and involucre usually numerous. Calyx-limb of five long, linear, subulate, coloured, deciduous segments. Fruit ovate, crowned with the reflexed styles. Carpels with five thickish, corky, equal ridges, the two lateral at the margin(?). Stylopod conical (Bab.)

L. montana, Koch. *Athamanta Libanotis*, Linn. Mountain Stone-Parsley. E. B. 138, L. C. 477 (*Seseli Libanotis*). Root tapering, crowned with the persistent nerves of former leaves. Stem erect, firm, one-three feet high, solitary, angular, furrowed, smooth, or with stellate pubescence, especially above, the upper part branched. Root-leaves on short petioles, doubly compound; leaflets opposite, deeply incised, with elliptic, mucronate lobes; the lower leaflets contiguous to the rach, crowded, and often crossing; stem-leaves on shorter, winged, or sheathing petioles, doubly or singly compound. Umbel many-rayed, more or less hairy or downy, erect when the fruit is ripe. Bracts of the involucre and involucre linear-pointed. Fruit hairy, or densely downy (tomentose). Chalky pastures. Hertfordshire, Cambridgeshire, &c. Biennial or perennial(?). July—September.

A. 3, C. 4. Lat. 50°—53°. Alt. 0—100 yards. T. 51°—48°.

XX. ***Ligusticum***, Linn. Lovage. Perennials. Leaves compound, either ternate or pinnate, smooth, with deeply cut or notched leaflets. Umbels terminal, with both general and partial involucre. Bracts membranous at the edges. Calyx-teeth pointed, erect, sometimes obsolete. Fruit elliptical, slightly compressed, furrowed, crowned

with the calyx, if present. Carpels oblong, with three dorsal and two marginal, slightly winged, sharp ridges, and many vittæ.

L. scoticum, Linn. Scottish Lovage. E. B. 1207, L. C. 478. Stem erect, smooth, striated, more or less tinged with red, nearly simple. Leaves biternate, on round petioles; leaflets roundish-ovate, truncate, cuneate, or unequal at the base, mostly trifid, with broad, toothed, or incised lobes, quite smooth, shining. Bracts of the involucre five-seven, linear; those of the involucre setaceous. Calyx-teeth minute. Corolla white. Fruit smooth, with prominent ridges and a broad crown. Rocky coasts of Scotland, and the North-East of England. Perennial. July.

A. 7, C. 20. Lat. 55°—61°. Alt. ? T. 48°—46°.

XXI. Fœniculum, Hoffm. Fennel. Biennial or perennial plants. Stem tapering, sub-striated, branching; ultimate segments of the leaves linear-setaceous. Involucral- and involucre-bracts generally absent. Calyx-limb obsolete. Fruit oblong. Carpels with five rather prominent, bluntly keeled ridges, the marginal ones a little broader. Carpophore adnate. Seed semi-cylindrical.

F. officinale, All. *F. vulgare*, Gært. Common Fennel. E. B. 1208, L. C. 476. Stem round, tapering, very smooth and shining, beautifully striated, branching, zigzag. Leaves tripinnate, with linear, setaceous, elongated segments. Umbels large, many-rayed. Flowers yellow. Petals involute, equal. Fruit nearly cylindrical. In several places, especially near the coast, apparently naturalized. Perennial. July—September.

A. 6, C. 12. Lat. 50°—54°. Alt. 0. T. 52°—49°.

XXII. Silaus. Besser. Pepper Saxifrage. Perennial, smooth plants. Leaves bi-quadrupinnate, with linear lobes. Involucre none, or one-two bracts. Involucre with many bracts. Calyx-limb obsolete. Fruit slightly tapering. Carpels with five acute, slightly-winged, equal ridges, and several contiguous vittæ. Column (carpophore) two-parted. Seed subcylindrical.

S. pratensis, Besser. *Cnidium Silaus*, Sm. Meadow Pepper Saxifrage. E. B. 2142, L. C. 479. Root tapering, fleshy. Stem furrowed, glabrous, branching, slightly leafy above. Leaves of the root tripinnate; leaflets lanceolate-linear, pointed, rough at the edges, on long petioles; stem-leaves mostly reduced to a few segments, or quite simple, with short, sheathing petioles. Umbels eight-fifteen-rayed. Flowers greenish yellow. Damp meadows. Perennial. July.

A. 12, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

XXIII. Meum, Tournf. Spiguel, Meu, Bald-money. Aromatic plants, with finely divided leaves. Umbels compound. Calyx obsolete. Fruit ovate, contracted at the apex, and crowned with the permanent styles. Carpels with three dorsal, and two marginal, equidistant, elevated ridges, and many intermediate vittæ. The fruit differs from that of *Silaus* in the less prominent ridges.

M. athamanticum, Jacq. Bald-money. E. B. 2249, L. C. 480. Root fleshy, vertical, crowned with the fibrous remains of the decayed petioles and leaves. Stems erect, from one to two feet high, branching. Leaves mostly radical, in spreading rosettes. Root-leaves on long petioles, with short, setaceous, divaricating segments; stem-leaves on short, sheathing petioles, with short, capillary segments; all tripinnate. Umbels many-rayed, subtended by a few bracts (involucre). Bracts of the umbellets more numerous. Fruit strongly ribbed, crowned by the disk (stylopod) and the remains of the styles. Dry, mountainous limestone (?) pastures. Perennial. July.

A. 9, C. 20. Lat. 52°—58°. Alt. 0—500 yards. T. 47°—42°.

XXIV. Crithmum, Linn. Samphire. Perennial, fleshy plants. Leaves bipinnate, with thick, linear, entire, turgid leaflets. Umbels terminal, with general and partial involucre. Calyx five equal, acute, inflexed sepals (obsolete, Endl.) Base of the styles large, tumid, pyramidal. Fruit elliptical, crowned with the calyx and styles. Carpels with a spongy pericarp and five elevated, sharp ribs. Seed marked with many vittæ.

C. maritimum, Linn. Common Samphire. E. B. 819, L. C. 481. Stems solid, striated, smooth, more or less erect, branching. Leaves bi-tripinnate, leaflets linear-oblong, fleshy, quite smooth. General and partial. Involucres of many elliptical or lanceolate, entire, reflexed bracts, which have scarious margins. Petals greenish white. Fruit crowned with a broad, convex disk (stylopod), and the remains of the styles. On rocky sea-shores. Perennial. August.

A. 7, C. 15. Lat. 50°—56°. Alt. 0. T. 52°—48°.

Note.—*Samphire* is a corruption of *St. Pierre*—*St. Peter's-wort*.

TRIBE III. Selinææ, Umbels compound, regular. Fruit compressed, parallel to the axis. Carpels without spines, with five primary, unequal ridges; the three dorsal ones filiform, sometimes rather indistinct, rarely winged, much smaller than the two marginal ridges; the two marginal ridges dilated into broad, either membranous or thick wings.

SUB-TRIBE I.—Angeliceæ. Fruit surrounded by two membranous wings; dorsal ridges winged or filiform.

Genera.—*Angelica*, *Archangelica*.

SYNOPSIS OF THE GENERA.

Angelica. Calyx obsolete.

Archangelica. Calyx with five minute teeth; herbage aromatic.

XXV. Angelica, Linn. *Angelica*. Stems round, smooth, hollow. Leaves very large, repeatedly compound, with serrated leaflets. Umbels compound, terminal and lateral, many-rayed. General involucre often wanting, partial, of numerous, sometimes leafy, serrated bracts.

Calyx obsolete. Fruit dorsally compressed, crowned with the floral receptacle and reflexed styles. Carpels convex, with three elevated dorsal ribs, and two lateral, dilated into a wing on each side. Vittæ variable.

Note.—The nucleated fruit, and the thicker ridges, and more numerous vittæ are the chief distinctions between *Archangelica* and this genus.

A. sylvestris, Linn. Wild Angelica. E. B. 1128, L. C. 482. Stems erect, stout, hollow, finely striated, branching. Leaves bipinnate; leaflets ovate, cordate, truncate or tapering at the base, unequally toothed; root-leaves on long petioles; stem-leaves with a large, dilated, often coloured, more or less membranous, sheathing, short petiole; segments (leaflets) few, small; umbels large, many-rayed; involucre of numerous setaceous bracts. Petals white, involute. Moist banks, shady places, meadows; frequent. Perennial. July, August.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards. T. 52°—39°.

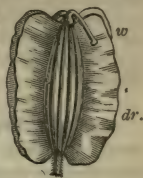


Fig. 179.—Fruit of *Angelica sylvestris*; *dr.*, dorsal ribs; *w*, the lateral or marginal wings.

XXVI. Archangelica. Hoffm. Garden Archangel. Stems very succulent, glaucous, quite smooth. Leaves on long hollow stalks, biternate, the central leaflets mostly trifid or three-lobed. Calyx very minute or obsolete.* Petals ovate, entire, green (herbaceous), carpels with three dorsal, thick, tubercled ridges, and two marginal ones dilated into broad wings, with numerous resinous channels (vittæ) intervening between the seed and the perisperm.

A. officinalis, Hoffm. E. B. 2561, L. C. Excluded Species. Stems very tall, round and polished. Leaves on hollow, round, polished, long stalks; leaflets broad, sometimes somewhat cordate or decurrent, the basal ones deeply toothed or lobed, the central and terminal one almost always three-cleft. Involucre of one setaceous bract or none. Involucel of several smaller similar bracts. Rays very numerous. Disk not elevated, wrinkled, broader than the apex of the fruit. Biennial. July. Thamesbank, above Vauxhall.

Note.—This plant grows luxuriantly in the smoky, dusty atmosphere and highly nitrogenized soil of London.

SUB-TRIBE II.—Peucedaneæ. Fruit usually lenticular, surrounded by a flat or thick rim (originating in the confluence of the marginal wings (ridges) of the carpels; dorsal ridges filiform, sometimes indistinct.

Genera.—*Peucedanum*, *Pastinaca*, *Heracleum*, *Tordylium*.

SYNOPSIS OF THE GENERA.

Peucedanum. Leaves bi-tripinnate, rarely quadripinnate; involucre and involucel with several bracts, rarely with none or one-three bracts.

* I have examined numerous examples of this species, and have not observed any trace of a calyx. The petals are green, linear-lanceolate, with setaceous long points (the dorsal nerves prolonged?).

Pastinaca. Leaves pinnate; involucre and involucl absent, or one-two bracts.

Heracleum. Leaves pinnate, with lobed segments; involucre with few caducous bracts or none; involucl with numerous bracts.

Thrydium. Leaves pinnate; involucre and involucl with several bracts.

XXVII. *Peucedanum*, Linn. Sulphurwort, Hog's-Fennel. Fetid, resinous, smooth plants. Stems solid, branching, leafy. Leaves repeatedly compound, with very narrow, acute, entire leaflets. Flowers in compound umbels, with both general and partial involucre. Calyx-teeth five, permanent. Fruit compressed, surrounded with a flat thin margin, crowned with the conical stylopod and styles, and with the setaceous calyx-teeth. Carpels broadly elliptical, with a notch at each end, nearly flat, with three dorsal slightly elevated ridges and two lateral obsolete ones.

1. ***P. officinale*, Linn.** Common or Officinal, or Sea Sulphurwort. E. B. 1767, L. C. 483. Stem striated, branching above, green, or somewhat glaucous. Lower leaves on long petioles, four-five times trifoliate, all the divisions petiolate. Segments *linear, elongate, entire, pointed, rough, divaricated*. Umbels many-rayed; rays unequal; bracts of the involucre several, subulate, those of the involucl linear or capillary. Flowers yellow-greenish or buff. Calyx-limb five-toothed. Fruit oblong, crowned by the enlarged convex base of the styles. Salt marshes; very rare. Perennial. July.

A. 1, C. 2. Lat. 51° — 52° . Alt. 0. T. 50° — 49° .

2. ***P. palustre*, Mönch.** *Selinum palustre*, Linn. and Sm. Marsh Sulphurwort. E. B. 229, L. C. 484. Roots not crowned by the persistent nerves of former leaves. Stem channelled, branching above, glabrous. Lower leaves on long petioles, tri-quadripinnate, *the first series of divisions erect, petiolate; segments pinnate or incised, lobes linear-lanceolate mucronate*. Rays twenty-thirty, unequal. Bracts of involucre and involucl lanceolate, *with broad membranous margins*. Fruit oblong, with a narrow blunt border and equal, contiguous, dorsal ridges. Turfy marshy places. Rare. Perennial. July—September.

A. 3, C. 6. Lat. 52° — 54° . Alt. 0—50 yards. T. 49° — 48° .

3. ***P. Ostruthium*, Koch.** Masterwort. E. B. 1380, L. C. 485. Stem erect, round, finely striated, branching above. Leaves biternate, leaflets broadly ovate or oblong, lobed and toothed; lobes and teeth with sharp ascending points. Involucre and involucl wanting. Umbels of many unequal rays. Umbellets with many spreading or deflexed unequal rays. Calyx obsolete. Fruit crowned with a thick cleft disk (stylopod). Scotland. In moist meadows. Common in cottage gardens in North Wales. Perennial. June.

A. 16. Alien.

XXVIII.—*Pastinaca*, Linn. Parsnep. Biennial or perennial large plants, with broad leaves. Umbels compound. Flowers

yellow. Calyx-teeth minute or obsolete. Styles much dilated at the base. Fruit with a broad margin, crowned with the discoid floral receptacle (stylopod) and styles. Carpels with three dorsal and two more prominent marginal ridges. Vittæ filiform.

P. sativa, Linn. Common Parsnep. E. B. 556, L. C. 486. Stems erect, stout, deeply furrowed, angular, hairy or glabrous, much branched and leafy, often two yards high. Lower leaves pinnate; leaflets nearly sessile, large, ovate or oblong, lobed, crenated or toothed. Umbels terminal, many-rayed. Involucre and involucrel absent. Petals small, greenish yellow. Fruit ovate, compressed, ribbed, tubercled, crowned with a broad, convex, crenate disk. Borders of fields. Biennial. July.

A. 9, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

Var. *a. sylvestris*. Root scarcely fleshy. Leaves downy.

Var. *β. sativa*. Root tapering, fleshy. Leaves glabrous and shining.

Is *P. sativa* the origin of the edible Parsnep?

XXIX.—Heracleum, Linn. Cow Parsnep. Hogweed. Perennial or biennial plants, with robust, furrowed stems and variously pinnated leaves, with broad sheathing petioles. Umbels compound, terminal, large, convex or flat. Involucre one- or few-leaved. Involucrel several-leaved. Marginal florets perfect and fertile; those of the centre abortive. Calyx-teeth minute, obliterated in the fruit. Styles broad and pyramidal at the base. Floral receptacle a little broader than the base of the styles. Fruit dorsally compressed, roundish, crowned with the receptacle and the styles. Carpels notched at the apex, and less or more at the base, with three dorsal slender ribs, and two distant broad marginal ones. Vittæ none, or only of small extent.

H. Sphondylium, Linn. Cow Parsnep. E. B. 939, L. C. 487. Stems robust, deeply furrowed and hollow, branching above, with rough, spreading, or deflexed hairs. Lower leaves pinnate, with broad, angular, lobed, serrated segments, on long, partial petioles; common petiole sheathing; upper leaves usually ternate, on similar but shorter petioles. Umbel with numerous, usually unequal rays, without an involucre. Involucrel-bracts setaceous. Fruit elliptical, compressed, rather hairy. Meadows. Hedges. Perennial. June, July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards. T. 52°—38°.

Var. *H. Sphondylium majus*. Stem erect, two-three yards high, very hairy, deeply grooved and acutely ridged. Root-leaves nearly two yards long; lower leaves pinnate, usually with three undulate, stalked, cordate, three-lobed large leaflets on each side of the leaf-stalk; upper trifoliate. Umbels supra-compound; the first series has four-six stout erect rays, all more or less leafy, except the central one,



Fig. 180.—Fruit of *Heracleum Sphondylium*. *b*, marginal rib or wing.

which terminates the axis of growth; rays of the second series numerous, long, without involucre bracts; rays of the third or ultimate series very numerous, subtended by numerous lanceolate, elongate bracts (involucre). Flowers pink; those of the ray very large, with deeply-cleft petals. Fruit ovate-ribbed, densely clothed with glandular hairs. In woods near Hagley and Clent, and at Chelsea Old Water Works. *Wood near Stone Palace John Sam*

XXX.—Tordylium, Linn. Hartwort. Annual, rough plants, having pinnate leaves, with broad, notched segments. Umbels compound, with general and partial involucre. Calyx-teeth subulate, deciduous, or permanent. Styles deciduous. Fruit almost round, crowned with the tumid bases of the styles, and furnished with a broad, thick, crenate or wavy margin. Carpels with three dorsal and two lateral ridges, all indistinct. Channels with one to three vittæ.

T. maximum, Linn. Great Hartwort. E. B. 1173, L. C. 488. Stem furrowed, scabrous, with reflexed, rigid hairs. Lower leaves three-parted or three-lobed, with sessile, ovate, crenulate or incised segments; segments of the upper leaves lanceolate, the terminal lobe or segment elongated. Umbels compact, five-ten-rayed, rays equal. Bracts linear, shorter than the umbel. Fruit invested with erect, rigid hairs, crowned by the calyx-teeth. Has it been found in England recently? Annual. June—August.

A. 1, C. 3. Lat. 51° — 52° . Alt. 0—50 yards. T. 49° — 48° .

T. officinale, Linn. Official Hartwort. E. B. 2440, L. C. p. 16. Stem hairy, about a foot high. Leaflets ovate, simply pinnate. Petals with very unequal lobes. Annual. June, July.

Said to have been found near London. Smith says, "possibly never seen in England, the preceding being mistaken for it."

A. 3. Alien.

TRIBE IV.—Laserpitieæ. Umbels regular, compound. Fruit compressed, parallel to the axis, or almost cylindrical. Carpels with nine ridges, the five primary filiform, the four secondary developed in membranous wings, or deeply incised, or cut into spines or bristles; resiniferous channels (vittæ) under the secondary ridges.

SUB-TRIBE I.—Thapsieæ. There is no example of sub-tribe *Thapsieæ* in the British Islands.

SUB-TRIBE II.—Daucineæ. Fruit furnished with spines or bristles by the incision of the secondary ridges.

Genus.—*Daucus*.

XXXI. Daucus, Linn. Carrot. Annual or biennial plants, with tapering roots, and round, furrowed, branching, leafy stems. Leaves finely divided. Umbels compound, with both general and partial involucre. Outermost flowers barren, inner fertile. Calyx

five-toothed. Fruit ovate, dorsally compressed, bristly, imperfect in the marginal and central florets; perfect in the intermediate ones. Carpels bristly on the primary ridges, and prickly on the intermediate ones.

D. Carota, Linn. Common Carrot. E. B. 1174, L. C. 489. Stems erect, round, striated, or furrowed, hispid, with prickly, spreading hairs. Leaves tripinnate; segments oblong or linear, pointed. Umbels with thirty-four very unequal rays, erect after flowering, and the whole assuming a concave shape. Bracts large, herbaceous, scarious, pinnate. Bracts of the involucl broadly membranous, linear, entire, elongated. Outer flowers larger than the inner. Bristles of the fruit as long as the diameter of the carpels. Meadows, pastures, sides of fields. Biennial. July.



Fig. 181.—Fruit of *Daucus Carota*.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—46°.

D. maritimus, With. E. B. 2560, L. C. 490. This species or variety is said to differ from *D. Carota*, in its more dilated, fleshy, and hairier leaflets, in the broader bases of the seed, bristles, &c. Cornwall, on the coast. Withering. Biennial. July.

A. 5, C. 12. Lat. 50°—54°. Alt. ? T. 52°—49°.

The late Professor E. Forbes proposed the following characters of the varieties of this puzzling species ("Bot. Gaz." vol. i., p. 295):—

Var. *a. campestris*. Umbels in fruit concave; flowers white, with entire-edged petals.

Var. *β. maritimus*. Umbels in fruit, flat or convex; flowers white, with entire-edged petals.

Var. *γ. ciliatus*. Umbels in fruit, flat or convex; flowers greenish-yellow, with fringed petals.

DIVISION II.—Campylospermæ. Seed (carpel) marked with a deep furrow on the side contiguous to the axis (commissural face), originating in the inflexion of the margins. Seed (fruit) rarely concave.

Genera.—*Turgenia*, *Caucalis*, *Torilis*, *Anthriscus*, *Chærophyllum*, *Myrrhis*, *Scandix*, *Conium*, *Physospermum*, *Smyrnum*, *Echinophora*, *Coriandrum*.

SYNOPSIS OF THE GENERA.

a. Carpels rough.

Turgenia. Leaves pinnate, or deeply pinnatifid; involucre two-three bracts; involucl usually with five bracts.

Caucalis. Leaves bi- or tripinnate; involucre none, or almost none; involucl with several bracts.

Torilis. Leaves pinnate or bipinnate; involucre absent or with one-several bracts; involucl with several bracts.

Anthriscus. Leaves bi- or tripinnate; involucre none; involucrel with several bracts, or with one-three bracts.

b. Carpels smooth.

Chærophyllum. Involucre absent, or with one-two bracts; involucrel with several bracts. Carpels smooth.

Myrrhis. Carpels large, without a beak, crowned only by the persistent styles.

Scandix. Fruit with a long tapering beak.

Conium. Leaves tri- or quadripinnate; involucre and involucrel with three-five bracts; fruit almost round.

Physospermum. Root-leaves triternate; carpels roundish.

Smyrniun. Leaves very large, ternate; flowers in dense rounded umbels; fruit black.

Echinophora. Leaves pinnate, with spinous segments.

Coriandrum. Lower leaves pinnate, upper bi- or tripinnate; involucre none, or of one bract; involucrel unilateral, of three bracts.

XXXII. *Turgenia*, Hoff. *Caucalis*, Linn. Annual plants, with pinnate or pinnatifid leaves and purplish flowers. Involucre with two-three bracts; involucrel usually with five bracts. Calyx-limb five-toothed, teeth setaceous. Carpels ovate-acuminate, with *five primary and four secondary nearly equal ridges*, cut into robust subulate spines, usually in two-three rows. Column cleft.

***T. latifolia*, Hoff. *Caucalis latifolia*, Linn. and Sm.** Broad-leaved Bur-Parsley. E. B. 198, L. C. 492. Stem furrowed, branched, scabrous. Leaflets oblong, with triangular or oblong toothed or entire lobes. Rays two-four. Bracts of involucre and involucrel oblong, concave, almost entirely scarious. Fruit large, longer than the pedicel, armed with rough spines. Chalky fields in Cambridge and Hertford. Annual. June—August.

A. 4, C. 6. Lat. 51°—53°. Alt. 0—100 yards. T. 50°—48°.

XXXIII. *Caucalis*, Linn. Bur-Parsley. Stem annual or biennial, branched, furrowed, leafy. Leaves doubly or triply pinnatifid, finely cut. Umbels lateral and terminal, of few rays. Involucres various. Calyx five-toothed, teeth triangular-lanceolate. Ovary oblong, bristly. Fruit rather compressed. Carpels ovate-oblong or acuminate, with the *primary ridges bristly*, the secondary with hooked prickles (spines?).

***C. daucoides*, Linn.** Common Bur-Parsley. E. B. 197, L. C. 491. Stems angular, furrowed, branched, nearly glabrous. Leaflets small, linear, entire, or oblong-incised, with slightly mucronate lobes. Rays two-five. Bracts of involucrel linear, unequal, ciliated. Fruit large, longer than the pedicels; spines of secondary ridges smooth, in one row, curved at the apex. Chalky fields. Annual. May—July.

A. 7, C. 15. Lat. 51°—55°. Alt. 0—100 yards. T. 49°—48°.

XXXIV. *Torilis*, Adans. Hedge-Parsley. Herbage very

rough, with bristles. Stem leafy, branched and furrowed. Leaves doubly pinnate, incised. Umbels terminal or lateral, with partial bracts, and sometimes general ones. Calyx five-toothed. Ovary ovate, bristly. Styles very tumid at the base. Carpels with bristly primary ridges, and with prickly interstices.

1. **T. Anthriscus**, Gært. Upright Hedge-Parsley. E. B. 987, L. C. 493. Stem erect, branched from the base, furrowed, rough, prickly hairs appressed, pointing upwards. Leaves rough, bipinnate; segments ovate or oblong, pinnatifid, or toothed; terminal segment elongated in the upper leaves. Umbels six-nine-rayed, *on long peduncles* at the top of the stem and branches. Involucre and involucre of *several membranous, linear, pointed, hairy bracts*. Prickles of the fruit *curved, not hooked*. Hedges. Biennial. June—September.

A. 16, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

2. **T. infesta**, Spreng. Spreading Hedge-Parsley. *Scandix infesta*, Linn. E. B. 1314, L. C. 494. Stems *spreading*, finely striated, usually branching from the base, rigid, with deflexed hairs. Leaflets ovate or oblong, pinnatifid or deeply toothed. Umbels three-seven-rayed, terminal. Involucre often absent, or with one-three very short bracts; bracts of the involucre several, hairy. Fruit small, with *hooked spines*. Dry fields, stony places. Annual or biennial. July.

A. 10, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

3. **T. nodosa**, Gært. Knotted Hedge-Parsley. E. B. 199, L. C. 495. Stems *prostrate* or reclining, branching and spreading, rigid, slender, striated, rough, with reflexed hairs. Leaves bipinnate, hairy, with erect, rather closely pressed hairs; segments deeply pinnatifid, linear, entire or incised. Umbels small, *sessile, or on very short stalks, opposite to the leaves*, with two-three *very short rays*; umbellets compact, *on very short stalks, roundish*. Involucre wanting; involucre with several linear, hairy bracts. Fruit small, sessile; outside carpels, with long, scabrous, straight spines; inside ones tuberculate. Waste, grassy, and stony places. Annual. June, July. Wands-worth steam-boat pier.

A. 13, C. 50. Lat. 50°—56°. Alt. 0—100 yards. T. 52°—47°.

XXXV. **Anthriscus**, Hoff. Beaked Parsley. Leaves bi- or tripinnate. Flowers white. Involucre none; involucre with few or several bracts. Calyx-limb almost none. Fruit compressed or nearly didymous. Carpel smooth or prickly, oblong-lanceolate, tapering abruptly at the apex into a short beak; the five primary ridges only obvious in the upper part of the fruit. Secondary ridges none. Vittæ (resiniferous channels) none, or almost none. Column entire, or cleft only at the apex.

1. **A. vulgaris**, Pers. Common Beaked Parsley. E. B. 818, L. C. 497. Stem striated, branching often from the base, glabrous, smooth. Sheaths hairy; leaves more or less hairy, tripinnate, with ciliated and pointed lobes. Umbels on short peduncles, three-seven-rayed; opposite to the leaves. Involucre with two-four bracts. Fruit

small, ovate, with a conical beak, furnished with sharp, curved spines. Hedgebanks, near towns and villages. Annual. April, May.

A. 17, C. 60. Lat. 50°—61°. Alt. 0—200 yards. T. 51°—46°.

2. **A. Cerefolium**, Hoff. Garden Chervil. E. B. 1268, L. C. 499. Stem erect, much branched, angular, smooth, shining, slightly hairy where the branches diverge. Leaves tri-pinnate; leaflets pinnatifid, smooth, shining. Umbels lateral, stalked; *three-rayed*, stalk of general and partial umbels downy. Bracts of involucre (partial or ultimate umbel) three, linear, hairy. Fruit (carpels) linear, smooth, long, on smooth short stalks, *about twice as long as its beak*. Supposed to be an escape from gardens. Annual. May, June.



Fig. 182.—Fruit of *A. Cerefolium*. *f*, fruit; *c*, column (carphophore); *st*, styles, with the enlarged base (stylod).

A. 9. Alien.

3. **A. sylvestris**, Hoff. *Chærophyllum sylvestre*, Linn. Wild Chervil. E. B. 752, L. C. 498.

Root thick; stem erect, ridged and furrowed, with short stiff hairs below, glabrous above, swollen below the joints, much branched. Leaves bipinnate; pinnæ (secondary series of leaves or leaflets) pinnate at the base and pinnatifid upwards, smooth and shining, the margins ciliated (fringed) with very short stiff hairs; the lower leaves on long stalks; the upper on short stalks or sessile. (This is the normal or regular character of all leaves; the root-leaves are on longer stalks than the stem-leaves, and the stalks of these latter decrease upwards till the leaves are sessile). Rays of the general umbel numerous, six-ten; rays of the partial umbels many, with many abortive florets; bracts of the involucre lanceolate, entire, hairy below, reflexed (ovate-lanceolate, ciliate). Fruit smooth, ovate, tapering, crowned with a short beak, and the stout, slightly spreading persistent styles. Hedgebanks. Common. Perennial. May, June.

A. 18, C. 82. Lat. 50°—61. Alt. 0—450 yards. T. 52°—43°.

XXXVI. Chærophyllum, Linn. Chervil. Annual or perennial plants. Stem branched, leafy. Leaves repeatedly pinnate. Umbels either terminal and stalked, or lateral and sessile. Partial involucre only. Calyx obsolete (none). Ovary slightly compressed, smooth. Carpels with five equal, obtuse ridges, and single vittæ in the interstices.

1. **C. temulentum** (?), (*C. temulum* ?),* Linn. Hare's Parsley. E. B. 1521, L. C. 500. Stem solid, or almost so, slightly sulcate, hairy, *swelling below the articulations*, branching above, marked with small brown spots. Leaves bipinnate, leaflets ovate-oblong, pinnatifid or incised, dark green, limp and hairy. Involucre wanting, rays ten-twelve; involucre of numerous, lanceolate-pointed, reflexed bracts. Fruit linear-oblong, smooth. Hedges, woods, waysides. Biennial (?). June, July.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

* The specific names, *temulum* and *temulentum*, are both ascribed to Linnæus.

2. *C. aureum*, Linn. Golden Chervil. E. B. 2103, L. C. p. 16. Stem angular, striated, downy, solid. Leaves *pinnate*, with sharply pinnatifid leaflets. Umbels many-rayed. Involucral bracts few or none. Partial bracts reflex, ovate, with long points. Flowers *cream-coloured*. Fruit crowned by the elongated spreading styles. Between Arbroath and Montrose.—Mr. George Don. Perennial. June.

A. 2. Alien.

3. *C. aromaticum*, Linn. Broad-leaved Chervil. E. B. 2636, L. C. p. 16. Stem erect, branched, stiff, angular, furrowed, hairy. Leaves *subternately bipinnate*; leaflets oblong acuminate, sharply serrated, hairy beneath. Involucre a single, lanceolate, membranous bract. Umbels spreading, ten-twelve-rayed. Involucel eight-ten reflexed bracts. Styles short, spreading, recurved. Fruit long, quite smooth, with five flattish ribs, contracted at the top, and crowned by the persistent styles. Forfar.—Mr. G. Don. Perennial. June.

A. 1. Alien.

XXXVII. **Myrrhis**, Tournef. Cicely. Perennial or biennial aromatic plants. Stem erect, branched, leafy. Leaves repeatedly pinnate, sharply cut, rather hairy. Umbels terminal, with partial bracts only. Innermost flowers barren. Calyx absent. Petals nearly uniform, inversely heart-shaped, with an inflexed taper point. Ovary furrowed, smooth, slightly compressed. Pericarp of fruit double, outer deeply five-furrowed, inner closely adhering to the seed. Fruit without a beak, crowned only with the thick basis of the permanent styles.

M. odorata, Scop. Sweet Cicely. E. B. 697, L. C. 501. Stem erect, round, hollow, leafy, hairy, striated. Leaves bipinnate, with pinnatifid or toothed segments, downy, soft. Involucre nearly or quite absent. Umbel of several rays. Involucel ciliated, reflexed bracts; fertile flowers two-five. Fruit large (an inch long) oblong, tapering above, shining, black when ripe, with three prominent, rough, dorsal ridges and two lateral ones, crowned by the conical bases of the styles. Odour of the whole plant highly aromatic. In many parts of Scotland and West Riding of Yorkshire. Perennial. July. *pleasiful about Perth John Sim*

A. 16, C. 50. Lat 50°—59°. Alt. 0—300 yards. T. 49°—45°.

XXXVIII. **Scandix**, Linn. Shepherd's-needle. Annuals with compound, finely subdivided leaves. Flowers in umbels either simple or compound, with only partial bracts. Calyx obsolete. Ovary more or less rough, with close hairs. Styles swelled at the base. Stigmas simple; in the barren flowers the stigmas are obtuse. Carpels with five ridges, attached to a very long, striated, hairy beak.

S. Pecten-Veneris, Linn. Shepherd's-needle. E. B. 1397, L. C. 496. Stems erect, finely striated, branching, slightly hairy or rough above. Leaves tripinnate, with narrow, linear, short, acute segments or lobes. Umbel simple, with leaf-like, incised or

entire erect bracts. Fruit slightly rough, with a beak more than four times its own length. Fields and gardens. Annual. June.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—46°.

XXXIX. Conium, Linn. Hemlock. Biennial plants. Leaves tripinnate, ultimate segments pinnatifid or incised. Leaflets (bracts) of the involucre and involucrel united at the base. Flowers white.

Calyx obsolete (none). Fruit nearly round, slightly compressed, nearly didymous (twin). Crowned with an enlarged hemispherical disk and cleft column. Carpels ovate, with five prominent primary undulated ribs, each with an indistinct resiniferous channel.

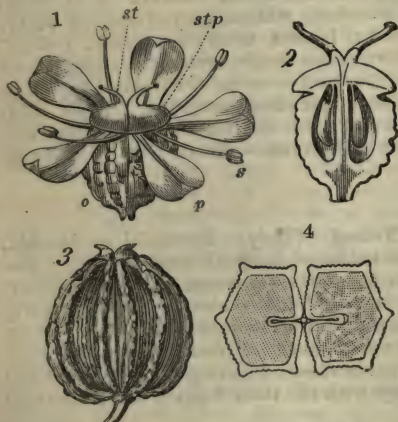


Fig. 183.—1, Flower of *Conium maculatum*; *o*, ovary; *p*, petal, showing the incurved point; *stp*, stylopod; *st*, style; *s*, stamen. 2, Section of ovary. 3, Fruit entire. 4, Transverse section of fruit.

C. maculatum,

Linn. Common Hemlock. E. B. 1191, L. C. 446. Stems stout, erect, finely striated, spotted, especially below, shining, branching above, two yards high. Leaves tripinnate, with cleft segments, and pointed, short, incised, or entire lobes. Umbels large

(twelve-twenty rays). Bracts of the involucre reflexed, lanceolate, membranous at the margin; bracts of the involucrel reflexed, short. Flowers about equal. Fruit tuberculate on the primary ridges. Hedges. Biennial. July.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

XL. Physospermum, Cass. Bladder-seed. Lower leaves triternate, upper reduced often to a scaly sheath. Bracts of the involucre and involucrel many. Calyx-limb five-toothed. Fruit laterally compressed, subdidymous. Carpels reniform-globose, with five filiform, slender, equal ridges, the lateral within the margin. Vittæ broad, solitary. Seed involute, semilunar.

Ph. cornubiense, D. C. Cornish Bladder-seed. E. B. 683, L. C. 447. Stems tapering, smooth, striated, hollow, branching. Root-leaves triternate, with wedge-shaped, incised, or deeply-toothed leaflets. Stem-leaves ternate, lanceolate, entire, all smooth and shining. Umbels terminal, with short, linear-lanceolate bracts. Florets on short pedicels, with lanceolate bracts. Fruit large, crowned

by the broadly expanded disk (stylopod), and the two reflexed styles. Bushy fields, in Devon (^p) and Cornwall.

A. 1, C. 2. Lat. 51°—58°. Alt. 50—100 yards. T. 50°.

XLI. *Smyrnium*, Linn. Alexanders. Biennial, smooth, shining herbs, with broad, bi- or triternate leaves. Umbels without bracts. Calyx five very minute teeth. Ovary ovate, angular, furrowed. Carpels turgid, each with three dorsal, prominent ridges; two lateral obsolete.

***S. Olusatrum*, Linn. Alexanders.** E. B. 230, L. C. 448. Stems erect, smooth, striated, solid (at least when young). Root-leaves ternate, with large, ovate, incised and serrated, shining leaflets. Stem-leaves with ovate or roundish leaflets; upper leaves trifid; all with dilated sheaths, which have broad, scarious, fringed margins. Flowers greenish-yellow, in round umbels. Fruit large, shining, prominently ribbed, crowned by the enlarged persistent base of the styles. Chiefly about old ruins. Biennial. June (?).

A. 16, C. 40. Lat. 50°—57°. Alt. 0—100 yards. T. 52°—47°.

XLII. *Echinophora*, Linn. Prickly Samphire. Very rigid plants. Stem round, furrowed, branching, leafy. Leaves bipinnatifid, with acute or spinous segments. Umbels terminal, with both general and partial involucre. Bracts spinous-pointed. Flowers of the circumference barren; those of the centre solitary and fertile. Calyx five, spinous-pointed, rigid, permanent leaves. Ovary in central flower only, turbinate. Fruit ovate, imbedded in the enlarged prickly receptacle. *Vitte* single.

***E. spinosa*, Linn. Sea-Parsnep.** E. B. 2413, L. C. Excluded Species. Root fusiform, fleshy. Stem spreading, branched, downy, glaucous, two-three feet high. Leaves doubly pinnatifid, with entire, spinous-pointed segments. Flowers white. General bracts numerous, partial ones smaller. Fruit globose, surrounded with three indurated, partial bracts. Sea-coasts of Kent and Lancashire. Not observed since the times of Gerarde and Ray. Perennial (?). July.

A. 3. Alien.

XLIII. *Coriandrum*, Linn. Coriander. Annual plants, with three-cleft root-leaves, and bi-tripinnate stem-leaves. Involucre wanting, or reduced to one bract; involucre with three unilateral bracts. Calyx teeth unequal; two of them elongate, linear. Petals unequal, the two opposite to the enlarged calyx-teeth large and deeply divided. Fruit globular, remaining united. Carpels hemispherical, with five primary, depressed, flexuous ribs, and four secondary, more salient, and straight ones. Resiniferous canals not distinct. Seeds concave on one side. Column cleft.

***C. sativum*, Linn. Common Coriander.** E. B. 67, L. C. 502. Stem erect, glabrous, finely striated, branched above, leafy. Lower leaves three-cleft, upper bipinnate, with pinnatifid segments and linear ultimate lobes. Umbels three-six-rayed. Outer petals and

sepals enlarged; bracts of involucre deflexed. This plant is remarkable for a nauseous, penetrating odour. Thames-side, about Chelsea, Battersea, and Wandsworth. Not very rare. A few plants have been noticed between Nine Elms and Putney for several years. Annual. July, August.

A. 8. Alien.

Ammi majus (?). Stem glabrous, striated, branched, leafy. Leaves tripinnate, with linear ultimate segments. Rays of umbel numerous, contiguous when ripe; the numerous rays of the umbellules are also contiguous when the plant is in the same state. Involucre of numerous pinnate bracts, with linear segments, terminating in a setaceous, subulate point; involucre of numerous spreading, simple, linear bracts. Carpels glabrous, oblong, strongly incurved when ripe. Steam-boat pier, Wandsworth. Annual. July, August.

ORDER LXXXIV.—**HALORAGIACEÆ. Haloragææ,**
Br. THE FEATHER-WEED OR WATER MILFOIL FAMILY.

Aquatic, submersed, or swimming plants, with whorled or opposite leaves. The flowers in the British species are axillary and sessile. Calyx very minute or absent. Petals four, minute, sometimes obsolete, inserted into a disk at the top of the calyx, along with the stamens. Ovary adherent to the calyx, one- or two-celled. Fruit dry, indehiscent (not opening), membranous or bony, with one cell or with several. Seeds solitary.

TRIBE—**Myriophylleæ.** Stamens eight, rarely four. Ovary four-celled. Stigmas four, sessile.

Myriophyllum, Linn. Water Milfoil. Feather-weed. (Federkraut, Ger.) Leaves verticilled (whorled), sessile, pinnatifid, with setaceous segments. Flowers verticilled, monœcious. Male flowers with four petals inserted in the upper part of the calyx-tube; petals longer than the sepals. Stamens eight-four. Petals usually wanting in the female flowers. Ovary four-celled. Stigmas four, sessile, large. Fruit four one-seeded hard nuts, crowned by the stigmas. Embryo cylindrical.

1. **M. spicatum**, Linn. Spiked Water Milfoil. E. B. 83, L. C. 381. Length of the stems varying with the depth of the water where they grow, slender, branching, swimming, emitting roots from the lower part. Leaves usually verticilled (four in a whorl), pectinate (comb-like), with capillary segments. Flowers *verticilled*, the verticils forming a leafless spike, terminating the stem and branches. *Floral bracts scale-like, entire, shorter than the flowers.* Stagnant water, in rivers, ponds, &c. Perennial. June—August.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—400 yards. T. 51°—46°.

2. **M. verticillatum**, Linn. Whorl-flowered Water Milfoil. E. B. 218, L. C. 380. Stem swimming, branched, leafy. Leaves whorled, pinnatifid, with setaceous segments. Flowers in rather dis-

tant whorls, the upper whorls nearly contiguous, *subtended at the base by pectinate bracts, more or less surpassing the flowers*. Ponds and ditches. Perennial. June—August.

A. 11, C. 40. Lat. 50°—55°. Alt. 0—100 yards. T. 51°—48°.

Var. *a. vulgare*. Bracts about as long as the leaves, much longer than the flowers.

Var. *β. pectinatum* (*M. pectinatum*, D. C.) Bracts much shorter than the leaves, scarcely longer than the flowers.

3. *M. alterniflorum*, D. C. Alternate-flowered Water Milfoil. E. B. 2854, L. C. 382. Leaves three-four in a whorl, submersed. Barren flowers alternate, about six, forming a leafless spike, *pendulous when in bud*, afterwards erect. Fertile flowers about three together, in axillary whorls at the base of the spike. This form differs from *M. spicatum*, in having the male flowers alternate on a drooping spike. Stagnant water. Perennial. June—August.

A. 18, C. 81. Lat. 50°—59°. Alt. 0—350 yards. T. 51°—43°.

ORDER LXXXV.—ONAGRACEÆ, Juss. in part. THE EVENING PRIMROSE FAMILY.

Herbaceous or shrubby plants, with simple, entire, or toothed, alternate or opposite leaves, and axillary or terminal flowers. Calyx tubular, with a four-lobed limb. Petals equal in number to the lobes of the calyx, and inserted into its throat. Stamens four or eight. Ovary consisting of several cells. Style filiform, with either a capitate or four-lobed stigma. Fruit four-celled, many-seeded.

SYNOPSIS OF THE GENERA.

Epilobium. Calyx-tubes four-angled, slightly longer than the ovary. Seeds with a silky plume.

Oenothera. Calyx-tube almost cylindrical, much longer than the ovary. Seeds without a plume.

Isardia. Calyx campanulate, four-toothed, not longer than the ovary; petals wanting.

Circea. Sepals and petals two respectively. Fruit two-celled.



Fig. 184.—1, Flower of *Oenothera* (Evening Primrose); 2, same, with the petals removed, showing the stamens and anthers; 3, cross section of the four-lobed and four-celled capsule.

I. *Epilobium*, Linn. Willow-Herb. Herbaceous plants, with simple, mostly toothed leaves. Flowers in terminal, leafy clusters.

Calyx monosepalous, with a four-parted limb and long, deciduous segments. Petals four, dilated upwards, more or less cleft or notched. Stamens eight, erect or reflexed. Ovary quadrangular, very long, with either entire (globular) or four-cleft stigmas. Capsule four-celled, four-valved, opening from the top downwards, with numerous small oblong seeds, each with a feathery crown.

SECT. I.—Leaves scattered; petals entire or almost entire; stamens and style deflexed.

1. ***E. angustifolium***, Linn. French Willow-Herb. E. B. 1947, L. C. 367. Stems erect, often reddish, simple or branched above, glabrous. Leaves sessile, or on short stalks, lanceolate, slightly toothed, glaucous below. Flowers purple, in long, lax, spike-like clusters; calyx coloured. Petals ovate or obovate, entire or slightly notched. Stigmas cruciate.

A. 18, C. 70. Lat. 50°—61°. Alt. 0—850 yards. T. 50°—39°.

Var. β . *E. brachycarpium*, Leigh. Capsule short. In dry places and woods. Perennial. July.

2. ***E. rosmarinifolium***, Hænke. Rosemary-leaved Willow-Herb. Rchb. lc. Cr. 341. Root creeping; stem short, erect or prostrate. Leaves linear, not veined, abruptly tapering at both ends. Flowers rose-coloured or white. Petals elliptic-oblong, without claws. Style as long as the stamens. (*Fide* Mr. Babington, p. 117, 4th edition.) Glen Tilt. Perennial. August.

In *E. rosmarinifolium* the leaves are quite entire; in *E. angustifolium* they are slightly toothed, and the petals are more pointed in this; they are rounded at the apex in the former.

SECT. II.—Petals spreading, notched or cleft. Stamens and style erect.

§ 1. Stigmas cruciate.

3. ***E. hirsutum***, Linn. Woolly Willow-Herb. E. B. 838, L. C. 368. Stems erect, branching, woolly or hairy, round, not winged. Leaves lanceolate, or oblong-lanceolate, sessile, clasping, toothed, soft and downy. Flowers large, rosy, in clusters, or leafy panicles. Divisions of the calyx lanceolate, half as long as the petals, forming a short point at the apex of the quadrangular, hairy, glandular bud. Marshy ditches and ponds. Perennial. July—August.

A. 15, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

4. ***E. parviflorum***, Schreb. Small-flowered Willow-Herb. E. B. 795, L. C. 369. Stems round, without prominent angles, densely covered with very soft down, not so tall as No. 3, and with fewer branches. Leaves oblong-lanceolate, downy and very soft, the lower opposite and clasping, the upper sessile or on very short petioles, *laxly toothed*. Divisions of the calyx *scarcely pointed*, nearly as long as the petals. Buds obtuse. Fruit erect, five-six times as long as the pedicels. Seeds obovate, with a fine silky crown. Usually with No. 3. Perennial. July.

A. 17, C. 75. Lat. 50°—59°. Alt. 0—200 yards. T. 52°—47°.

5. ***E. montanum***, Linn. Mountain Willow-Herb. E. B. 1177,

L. C. 370. Root horizontal, fibrous below and stolon-bearing above. Stem usually solitary, erect, without prominent lines, simple or branching, round, tapering, downy. Leaves on short petioles, *glabrous*, ovate, *rounded*, the lower *slightly cordate at the base*, strongly and laxly toothed, *teeth unequal*. Flowers pale rose, small, in leafy panicles. Divisions of the calyx slightly keeled and ciliated, acute. Dry uplands and on walls. Perennial. June, July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—600 yards. T. 51°—41°.

E. lanceolatum, Koch. L. C. 370 b. Stem two feet high, less or more, with axillary tufts of leaves. Leaves *lanceolate*, *tapering at the base*, stalked. Perennial. June, July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—600 yards. T. 51°—41°.

§ 2. Stigmas globular.

6. **E. palustre**, Linn. Marsh Willow-Herb. E. B. 346, L. C. 372. Stems solitary or few, erect, *without prominent lines*, simple or branching, glabrous, or with short down. Leaves glabrous, *narrow*, *lanceolate*, strongly and *laxly toothed*, on short petioles, mostly opposite, with no mark of decurrence. Flowers small. Divisions of the calyx lanceolate, with a coloured margin, and short abrupt point. Seeds *elliptical*, tapering at the base, surmounted by *stipitate plumes* (aigrette). Marshy places. Perennial. July—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—650 yards. T. 51°—40°.

7. **E. tetragonum**, Linn. Square-stalked Willow-Herb. E. B. 1941, L. C. 373. Stem erect or ascending, *with two-four elevated lines*. Leaves glabrous, oblong-lanceolate, often narrow, closely toothed, rarely sinuate, opposite, sessile or nearly so, on decurrent petioles forming the prominent lines of the stem. Flowers in clusters or in leafy panicles, axillary and solitary, small, rose-coloured. Seeds *oblong*, *plume sessile*. Moist places, ditches, &c. Perennial. July—September.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—700 yards. T. 51°—40°.

Var. β . Stem branched, with four prominent lines; leaves erect, lanceolate, narrow, deeply toothed.

E. obscurum, Schreb. *E. virgatum*, Bab., A. N. H., 2nd ser., vol. xvii., p. 236, Fr. (?) The author of this species says, "resembling *E. tetragonum*, but the capsule much shorter." (See "Manual," in loco 118.) "Florileg. Brit.," Fig. 624. Stem one-three feet high, with very faint lines; scions from the lower joints not ending in a rosette of leaves. Leaves lanceolate, slightly toothed, *not decurrent*, lower leaves tapering towards their *rounded*, *slightly denticulated base*; stigma undivided. Seeds *oblong obovate*, *not pointed*. Deep ditches in peat-bogs. Perennial. July, August.

The following account of a supposed new species, discovered, described, and distributed by Mr. Baker, of Thirsk, is extracted from the "Phytologist," N. S., vol. ii., p. 19:—"Stem nearly two feet high, much branched, quadrangular below, procumbent and creeping widely at the base, sending out rootlets and stolons; stolons numerous, elongated, leafy; at the flowering time slender, the lower ones

afterwards thickened, and bearing a rosette of obovate leaves. Leaves lanceolate-ligulate, varying in breadth, when narrow nearly or quite entire, when broader sparingly denticulated, narrowed more or less gradually to a decurrent haft. Sepals lanceolate; stigmas entire at first, finally sometimes quadrifid; seeds about half a line long, oblong fusiform, broader above." If a new species, the author proposes to name it *ligulatum*."

8. *E. roseum*, Schreb. Smooth-leaved pale Willow-herb. E. B. 693, L. C. 371. Root horizontal, with strong branching fibres. Stems erect or ascending, with two-four prominent lines, branching, almost quite glabrous. Leaves only very slightly downy about the petiole, tapering at both ends, oblong, strongly toothed, teeth unequal, opposite below, *all petioled*, petioles decurrent, the decurrency forming the prominent lines of the stem. Petals small, pale rose, not much longer than the linear divisions of the calyx. Fruit downy. Seeds ovate, oblong, plume sessile. Usually in moist places. Hyde Park, opposite Bayswater Road. North Wales. Perennial. July—September.

A. ? C. ? Lat. 50°—58°. Alt. 0—200 yards. T. 50°—47°.

9. *E. alsinifolium*, Vill. Chickweed-leaved Willow-Herb. E. B. 2000, L. C. 374*. Roots widely creeping. Stems several, six-twelve inches high, simple, angular, with two elevated hairy lines, leafy, reclining at the base. Leaves *ovate pointed*, with a few minute teeth on the margin, nearly sessile, glabrous. Petals notched, rose-coloured, veiny. Fruit downy. North of England and Scotland, in mountainous districts. Perennial. July.

A. 8, C. 15. Lat. 50°—59°. Alt. 200—1000 yards. T. 45°—37°.

Note.—This looks like a broad-leaved form of *E. tetragonum*.

10. *E. alpinum*, Linn. Alpine Willow-Herb. E. B. 2001, L. C. 374. Roots creeping. Stems erect, ascending, or reclining at the base, simple, with two hairy lines, leafy. Leaves *attenuated below*, on very short petioles, oblong or ovate-oblong, entire or slightly toothed, bearing axillary rosettes of leaflets. Flowers about two, rarely one-three, bright red, drooping in bud. Calyx-segments ovate, half as long as the cleft petals. Alpine rivulets in Scotland. Perennial. July.

A. 5, C. 12. Lat. 53°—59. Alt. 400—1300 yards. T. 41°—34°.

11. *E. anagallidifolium*, Lam. An. N. H. 2nd ser. xvii. Flowering stems from a long rooting base. Sepals *oblong, blunt*. Higher mountains (?) than those on which *E. alpinum* grows. Perennial. July.

Note.—The barren stems of this plant are described as æstival (of summer growth?), leafy, not rosulate (without the rosette-like tuft of root-leaves formed the previous season).

II. *Oenothera*, Linn. Evening Primrose. Herbaceous plants, with simple leaves and axillary and solitary flowers. Calyx monosepalous, with a cylindrical tube, and a four-deeply-cleft limb, in four acute, reflexed, partly combined segments. Petals four, obcordate. Stamens eight. Ovary angular and furrowed, with a long thread-shaped style, and four-cleft, cruciate stigma. Fruit capsular, four-

celled. Capsule four-valved, with numerous seeds. Seeds without a downy crown.

Æ. biennis, Linn. Evening Primrose. E. B. 1504, L. C. 375. Stem erect or reclining at the base, stout, hairy, leafy. Leaves oblong-lanceolate, tapering below, usually sharp-pointed, entire, or slightly toothed or fringed. Divisions of the calyx membranous, linear-lanceolate, pointed, reflexed. Petals large, longer than the stamens. Moist places; a very common garden plant. Naturalized. Biennial. July. A. 11. Alien.

III. **Isnardia**, Linn. Calyx bell-shaped, with a four-toothed limb. Petals wanting. Stamens four, opposite to the calyx-teeth. Style filiform, stigma capitate. Capsule short, four-valved, four-celled, many-seeded, with loculicidal dehiscence.

I. palustris, Linn. Marsh Isnardia. E. B. 2593, L. C. 376. Stems prostrate, rooting or swimming, often branching, glabrous, leafy. Leaves oblong, or oblong-roundish, pointed, entire, tapering at the base, on short petioles. Flowers herbaceous, with two small bracts. Fruit ovate, bluntly quadrangular, calyx persisting and spreading horizontally. Pools and marshy places. Petersfield and Brockenhurst, Hants; Buxted, Sussex. Perennial. July, August.

A. 1, C. 2. Lat. 50°—51°. Alt. 0—50 yards. T. 50°.

It has been for some time eradicated in the Petersfield and Buxted localities.

SUB-ORDER.—**Circææ**. *Circæaceæ*, Lind. THE ENCHANTER'S NIGHTSHADE TRIBE. Herbs with opposite, petiolate, toothed leaves. Inflorescence in terminal and lateral racemes. Calyx deciduous, tubular, with a two-parted limb. Petals two, alternate with the calyx-lobes. Stamens two, alternate with the petals. Ovary two-celled, with one erect ovule in each. Fruit capsular, two-valved, two-seeded.

IV. **Circæa**, Linn. (Tournf.?) Enchanter's Nightshade. Perennial herbaceous plants, with erect stems and opposite leaves. Flowers white, often with a tinge of rose-colour, in erect, terminal clusters. Sepals two, or calyx-limb parted (bifid), caducous, with the segments reflexed; tube of the calyx obovate, abruptly constricted. Petals cleft (bifid). Stamens two. Style filiform. Stigma notched (emarginate). Fruit obovate or round, with a short neck, covered with long, hooked hairs, coriaceous, not opening, consisting of two one-seeded cells. This genus is easily distinguished from the other genera of this order by its two petals, round two-celled capsule, and one-seeded cells.

1. **C. lutetiana**, Linn. Enchanter's Nightshade. E. B. 1056, L. C. 377. Root creeping. Stem twelve-eighteen inches high, erect, simple or branched, slightly downy on the upper parts, round and enlarged at the junctions. Leaves cordate at the base, acuminate or ovate pointed, *laxly toothed*, or *sinuate* or *entire*, glabrous, shining opposite, on long leaf-stalks. Flowers in slender, erect clusters, on

horizontal pedicels. Fruit reflexed. In moist shady places. Perennial. June—August.

A. 17, C. 70. Lat. 50° — 59° . Alt. 0—200 yards. T. 51° — 47° .

2. *C. alpina*, Linn. Mountain Enchanter's Nightshade. E. B. 1057, L. C. 378. Stem ascending or erect, tapering, smooth, or very slightly downy, leafy, ten-fifteen inches high. Lower leaves stalked, cordate, lobed or toothed, crisp; upper leaves sessile or on very short stalks, toothed, downy at the edges, surface of the leaves smooth and shining. Flowers in lax clusters, on slender stalks; lower ones with setaceous bracts. Sepals membranous. Petals short, narrow. Fruit deciduous. Woods and shady places; in mountainous districts. Perennial. July, August.

A. 14, C. 40. Lat. 51° — 60° . Alt. 0—200 yards. T. 47° — 45° .

Var. β . *C. intermedia*, Ehrh. Stem taller than in the typical form, more downy. Flowers larger. Petals and sepals nearly equal, the latter less membranous. This looks like an alpine variety of *C. lutetiana*.

ORDER LXXXVI.—**POMACEÆ**, Juss. THE APPLE-TREE FAMILY.

Trees or shrubs, sometimes with spinous branches. Leaves scattered, often tufted, simple, toothed, lobed or pinnate. Stipules free,

deciduous, rarely persistent. Flowers solitary, in umbellate tufts, in clusters or in corymbs, very deciduous. Limb of the calyx five-parted. Petals five, on a thin disk at the gorge of the calyx. Stamens fifteen-thirty, inserted on the gorge of the calyx with the petals. Ovary united with the calyx, composed of five carpels or fewer by abortion, five-celled or fewer-celled; ovules inserted at the inner angle of the cells. Styles five, or one-four by abortion, either free or more or less coherent at the base. Stigma simple. Fruit fleshy or pulpy (partly formed of the developed calyx), five-celled or one-four-celled by abortion. Cells two-seeded



Fig. 185.—*Pyrus Malus*. 1, A sprig in flower; 2, a sprig in fruit; 3, a flower; 4, horizontal section of the fruit.

or one-seeded by abortion, rarely many-seeded, endocarp (lining of

the cell) membranous, cartilaginous or bony. Seed ascending, rarely horizontal, without albumen. Embryo straight. Radicle directed towards the hilum.

TRIBE I.—Ovary (with a bony endocarp). Fruit, a nut.

Genera.—*Mespilus*, *Cratægus*, *Cotoneaster*.

SYNOPSIS OF THE GENERA.

Mespilus. Divisions of the calyx almost leaf-like, persisting.

Cratægus. Lobes of the calyx short, withering.

Cotoneaster. Fruit turbinate; nuts adherent to the fleshy calyx, but not cohering at the centre.

I. *Mespilus*, Linn. Medlar. Spinous trees or shrubs. Leaves nearly entire, with deciduous stipules. Flowers white, nearly sessile, mostly solitary. Calyx five-parted, with leaf-like divisions. Ovary five-celled, with two ovules in each cell. Styles five. Fruit roundish-turbinate, crowned by the developed leaf-like sepals, the upper part not united with the calyx, forming a large dilated disk, and *exposing the upper portions of the bony cells*, which are one-seeded by abortion.

1. ***M. germanica*, Linn.** Common Medlar. E. B. 1523, L. C. 359. Shrub branching from the base, slightly spinous; rarely a low tree. Leaves on short stalks. Flowers large, with linear bracts. Calyx woolly, with divisions longer than the tube. Fruit large, fleshy, finally becoming pulpy and sweet (when fermentation takes place). Hedges.

A. 4, C. 5. Lat. 50°—54°. Alt. ? T. 50°—48°.

II.—*Cratægus*, Linn. Hawthorn. Spinous shrubs. Leaves more or less lobed or cleft. Stipules leaf-like, usually persistent. Flowers in a branching corymb, with caducous bracts. Calyx with a five-lobed limb, lobes short, triangular. Ovary one-two-, rarely three-five-celled. Fruit *round, crowned by the withered calyx-teeth*, the upper part free, constricted near the summit, with one bony one-seeded nut, rarely two-five nuts.

C. *Oxyacantha*, Linn. Common Hawthorn. E. B. 2504, L. C. 360. Shrub very spinous, forming a tufted bush, and sometimes a small tree. Leaves glabrous, leathery, petioled, obovate, wedge-shaped, more or less deeply divided into three-seven lobes, lobes toothed or incised above. Stipules toothed. Calyx reflexed, downy or glabrous. Fruit red, farinaceous, pulpy. Flowers in May, bears fruit in September. Woods and hedges. A valuable hedge-shrub.

A. 17, C. 75 (80). Lat. 50°—59°. Alt. 0—500 yards. T. 52°—44°.

Var. *a. vulgaris*. Leaves deeply pinnatifid; peduncles and calyxes of the flower downy or hairy; style usually single; fruit bearing a single nut.

Var. *β. oxyacanthoides*. Leaves less deeply pinnatifid; peduncles

and calyx of the flower glabrous, or nearly so; styles one or two, rarely three; fruit larger, bearing one-two, rarely three nuts. A later flowering plant than var. *a*.

III. **Cotoneaster**, Lind. Stone-Apple. Shrubs, with simple entire leaves and partly procumbent branches. Flowers solitary. Calyx turbinate, five-parted or five-toothed, with leaf-like divisions. Petals roundish. Styles two-five. Ovary five-celled, with two ovules in each cell. Fruit pear-shaped, cottony, crowned by the persistent limb of the calyx.

C. vulgaris, Linn. Common Stone-Apple. E. B. 2713, L. C. 361. Small tree or bush. Leaves roundish, ovate or obovate, on short petioles, leathery, smooth above, densely downy, cottony, or shaggy below, alternate. Flowers pale red, drooping. Calyx segments ovate, blunt. Petals round; styles three. Fruit pear-shaped, at first red, finally black or dark brown. Great Orme's-head, North Wales. Shrub or tree, July.

A. 1, C. 1. Lat. 53° — 54° . Alt. 0—200 yards. T. 48° — 47° .

Cosson and Germain remark that this shrub is rarely spontaneous in the hedges within seventy miles of Paris (the limits of their Flora), but they say it is planted in gardens and plantations.

TRIBE II.—Ovary with a thin (sometimes cartilaginous) but not

Their spells were vain; the boys returned
To the queen in sorrowful mood
Crying that "witches have no power
Where there is Roan-tree wood"
Lardley wain of
Spindleston Heughs.

mounted by the persistent
two-one seeds in each. Endocarp cartilaginous.

1. **P. Malus**, Linn. E. B. 179, L. C. 363. Tree, usually low, with spreading branches. Leaves on short petioles, toothed or crenulate. Flowers large, rosy, or white, on short pedicels. Fruit glabrous, on a pedicel not much longer than the depth of the depression where it is inserted.

Var. *β. tomentosa*. The cultivated varieties have downy leaves. Woods and hedges. Flowers in May; bears fruit in September.

A. 16. C. 60. Lat. 50° — 57° . Alt. 0—200 yards. T. 51° — 47° .

2. **P. communis**, Linn. Pear-tree. E. B. 1784, L. C. 362. A

more or less lofty tree; often a branching shrub in a wild state. Leaves ovate, or obovate, or ovate-oblong, petioled, with short points, finely toothed or crenulate, downy below, coriaceous, shining above. Flowers large, *on long stalks*. Fruit smooth, bitter in the spontaneous, and more or less sweet in the cultivated state. Hedges and woods. Flowers in April; bears fruit in August.

A. 8, C. 20. Lat. 50°—54°. Alt. 0—100 yards. T. 51°—48°.

V. Sorbus, Linn. Service-tree. Trees or shrubs not spinous. Leaves pinnatifid or lobed. Flowers white, small, in branching, many-flowered corymbs. Calyx five-cleft. Petals roundish. Ovary two-five-celled, with two ovules in each. Styles two-five. Fruit roundish or top-shaped, not umbilicate at the base; umbilicate at the apex, and crowned by the withered or permanent limb of the calyx. Fruit with a membranous endocarp, one-four-celled, very unequally developed, usually one-seeded, rarely five-celled.

SECT. I.—Leaves pinnate.

1. **S. domestica**, Linn. *Pyrus domestica*, Sm. True Service-tree. E. B. 350. Large tree, with erect branches, and *glabrous, glutinous buds*. Leaves pinnate, thirteen-seventeen opposite pairs, with oblong, toothed, downy, or silky, elliptic-lanceolate leaflets (quite smooth when full grown). Styles five. Fruit *large*, fleshy, *bitter*, but becomes sweet after fermentation. A solitary tree in Wyre Forest. It was in existence in 1857. Flowers in May.

A. 5. Alien. See "Phytologist," N. S., vol. i., pp. 278, 343, 354, 392.

2. **S. Aucuparia** Linn. Rowan-tree. Mountain Ash. E. B. 337, L. C. 36. Small tree with erect branches. Leaves pinnate; leaflets ten-fourteen, with a terminal one, opposite, ovate-oblong, toothed, glabrous above, hoary-silky below. Flowers small, white, corymbose. Fruit *small, globular*, with two-three unequal cells, rarely four; red, pulpy-succulent, acid, bitter. Flowers, May, June. Fruit, September.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—900 yards. T. 50°—38°.

SECT. II.—Leaves lobed or lobed-toothed.

3. **S. torminalis**, Crantz. Wild Service-tree. E. B. 298, L. C. 364. Small tree. Leaves glabrous, shining, *cordate or truncate at the base*, lobed; *lobes triangular* or lanceolate, acuminate, unequal, more or less diverging, *toothed or serrated*. Styles glabrous, two-five. Fruit small, oblong, roundish, fleshy, becoming pulpy when ripe, and finally of an acidulous taste. Hedges, South of England. Perennial. June.

This tree is often confounded with *S. domestica*. *Its fruit is not of good repute.*

A. 8, C. 30. Lat. 50°—54°. Alt. 0—200 yards. T. 50°—48°.

The following account of this tree is from the late Dr. Bromfield's "Flora Vectensis," p. 167. The dimensions were taken last summer, August, 1857, from which we ascertained that it was still growing and thriving:—

"The largest Wild Service-tree in the island with which I am acquainted stands in Quarr Copse, about twenty yards from the Bin-stead entrance, on the left hand, and perhaps a dozen yards from the main path, overhanging a deep hollow. The girth of this tree, at about two feet from the ground, I found to be six feet eleven inches; at three feet, it measured five feet six inches; and at five feet, five feet two inches. Its height I estimate at little under forty feet. The large, rounded, oak-like head, spreading limbs, and leaning trunk, render it a very picturesque object, and especially so when clothed in the gorgeous covering of autumn. The specimen is probably of great age, and, though flowering freely, fruits but sparingly. Trees sufficiently large or old for bearing are indeed seldom to be met with in our woods, from its being cut periodically with the copse-wood.

"This species has long been, and still is, strangely confounded with the true Service-tree (*P. domestica*), a very different kind, with much larger, pear-shaped fruit and pinnated leaves, like those of the Mountain Ash, but which there is no reason to believe was ever found wild in Britain, and certainly is not so with us, though described as common in the Isle of Wight, our *P. torminalis* having been uniformly mistaken for it, and the error perpetuated by the similarity of names, and unscrutinizing habits of compilers.

"The Wild Service-tree is not a native of either Scotland or Ireland."

4. **S. Aria**, Crantz. White Beam-tree. E. B. 1858, L. C. 365. Usually a taller tree than the preceding. Leaves *white-cottony below* in all stages, *ovate or oblong*, doubly or unequally toothed, base tapering, nearly entire. Styles two-three, hairy below. Fruit roundish, pulpy when ripe, of an acidulous taste. Hedges. Common on chalky hills. Perennial. May. Fruit, August, September.

A. 13, C. 40. Lat. 50°—59°. Alt. 0—300 yards. T. 51°—45°.

S. fennica, Kalm; *pinnatifida*, *P. hybrida*, Sm. 365 b. The Hybrid Beam-tree. Lower portion of the leaves truly pinnate, pinnatifid in the centre, and doubly and deeply serrated towards and at the apex. The divisions of the leaves seem to be the sole characteristic difference between this plant and *P. Aria*. Isle of Arran.

Area, &c., not determined.

S. scandica, Fr. L. C. 365 c. Leaves broadly lobed. Lobes triangular-ovate, toothed most deeply about the centre of the leaf. Finely serrated at the base, and one-fourth upwards narrowly lobed, from three-fourths from the base to the apex. The lobed leaves appear to be the sole distinction between this plant and *S. Aria*.

Note.—Are not *S. fennica* and *S. scandica* cultivated varieties of *S. Aria*, and consequently found in plantations and shrubberies?

† † Ovary free; stamens inserted on the calyx (perigynous).

Amygdalaceæ. Trees with drupaceous fruit.

Rosaceæ. Shrubs or herbaceous plants, with compound leaves, and generally polycarpous fruit.

Crassulaceæ. Fleshy (succulent) plants, with regular isomerous flowers.

Illecebraceæ. Slender plants with small or minute flowers; sepals present only in some genera.

Portulacææ. Succulent plants, with minute or small flowers.

Lythraceæ. Herbaceous plants, with axillary flowers, and two-celled, many-seeded capsules.

Leguminiferæ. Flowers papilionaceous; stamens more or less connected.

Rhamnaceæ. Trees or shrubs with baccate fruit.

ORDER LXXXVII.—**AMYGDALACEÆ**, Juss. THE ALMOND FAMILY.

Gum-yielding trees or shrubs. Branches sometimes spinous. Leaves scattered, often in tufts, simple, toothed, with free, deciduous stipules. Flowers solitary or in pairs, in umbellate tufts, or in corymbs or clusters, very caducous. Sepals five, united in a campanulate tube, with a five-cleft limb. Petals five, inserted at the mouth of the calyx on a thin disk, free, caducous. Stamens fifteen-thirty, inserted with the petals. Ovary free, with a single one-celled carpel, containing two ovules. Style one; stigma capitate. Fruit (drupe) fleshy, succulent, with a furrow corresponding to the edges of the carpellary leaf, containing a single ligneous or bony nut, which is one-seeded by abortion, rarely two-seeded. Seed without albumen. Radicle directed towards the hilum.

Prunus, Tournf.

Sloe, Plum, Cherry. Trees or shrubs, usually more or less thorny (the thorns on these are abortive branches). Leaves simple, serrated, stalked, involute or plicate



Fig. 186.—*Prunus spinosa*. 1, Part of a branch in flower; 2, flower, showing the petals, stamens, and single style; 3, branch in fruit; 4, horizontal section of the fruit, showing the succulent (drupaceous) part and the bony nut.

before expansion. Flowers white, solitary or in pairs, or aggregate. Drupe (fruit) round or oblong, succulent, usually coloured, with a glaucous efflorescence. Nut oblong (nearly globular in the Cherry), more or less compressed, smooth or slightly furrowed, consisting of two slightly-furrowed valves, with a prominent margin.

1. ***P. spinosa***, Linn. Sloe-tree. E. B. 842, L. C. 314. Stems very rigid, six-ten feet high (usually in several slender rod-like stems from one root), more or less spinous. (The spines are long, sharp, and terminal when old.—Bromfield). Leaves elliptical or obovate, tapering towards the base, hairy or downy on the under side (the young shoots and leaf-stalks are also more or less hairy). Flowers white, *solitary* or in pairs or in small tufts, usually expanded before the leaves. Fruit on short pedicels, rounded, ovate (obovate), with a groove or seam on one side. Nucleus (nut) roundish, rugose, with an adhering pulp. In hedges, thickets, &c. Tree or shrub. Flowers in April, and bears fruit in September.

A. 18, C. 80. Lat. 50°—59°. Alt. 0—300 yards. T. 51°—46°.

Var. *β*. *P. insititia*, Linn. Wild Bullace-tree. E. B. 841, L. C. 314 b. Range as set under *P. spinosa*. (?) Leaves downy on the under side, two-flowered; flowers simultaneous with the leaves (?). Fruit large globular, or subglobular, black, glaucous, green, or yellow. In hedges.

Var. *γ*. *P. domestica*, Linn. Common Wild Plum-tree. E. B. 1783, L. C. 314 c. Leaves oblong or obovate; fruit drooping, large, black, glaucous, violet, or reddish. In hedges, near habitations.

Note.—There are numerous varieties of all these forms.

2. ***P. padus***, Linn. Bird Cherry. E. B. 1383, L. C. 315. A small tree or shrub, with erect or spreading, slender, flexible branches. Leaves large, ovate-oblong, tapering at the base, toothed and wrinkled. Flowers numerous, small, in *long, pendulous clusters*. Sepals rounded, blunt, fringed. Petals twice as long as the sepals. Fruit globular, black or red, about as large as peas, bitter and rough (austere). In hedges and woods. Tree. Flowers in May. Fruits in August.

A. 15, C. 50. Lat. 51°—59°. Alt. 0—350 yards. T. 49°—43°.

3. ***P. avium***, Linn. Wild Cherry. E. B. 706, L. C. 316*. A tree thirty-forty feet in height, or more, with the epidermis (outer bark) often peeling off in circular zones; in old trees the bark is very rough. Branches spreading, *never pendulous* the whole forming a round head. Leaves obovate or obovate-oblong, glandular, usually downy below, in tufts, with longer leaf-stalks than those in *P. Cerasus*. Flowers on very long pedicels (two inches), three-five in each umbel. Petals flaccid, scarcely spreading (Bromfield). Ovary turbinate, ribbed, with a somewhat longer neck than in *P. Cerasus*. Fruit roundish or round, and sub-cordate at the base. Nucleus (nut) *round and smooth*. Woods. Tree. Flowers in May, and is in fruit in July.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—150 yards. T. 51°—46°.

Var. *a. sylvestris*. Fruit round, black, about the size of a pea, bitter and acid.

Var. *β. Juliana*, Gean. Fruit larger than in var. *a*, red or black, juicy, sweet, with some acidity.

Note.—The petals in *P. avium* are larger than they are in *P. Cerasus*, and the scales of the leaf and flower-buds never become leaves as they partly do in the Cherry-tree. The distance of the glands from the base of the leaf is greater than in the above.

4. *P. Cerasus*,* Linn. Cherry. E. B. 2863, L. C. 316. Shrub or tree, with more or less spreading branches, which are often slender and pendulous. Leaves obovate-round or obovate-oblong, shortly and abruptly acuminate, doubly-toothed, glabrous and wrinkled, stalked. Flowers three-four together, in umbellate clusters, on *long erect pedicels*. Segments of the calyx reflexed. Woods and hedges. Flowers April, May. Bears fruit in June and July.

A. 8, C. ? Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

C. austera, Leighton's "Flora of Shropshire," is a synonym of the above.

ORDER LXXXVIII.—**ROSACEÆ**, Juss. in part. THE ROSE FAMILY.

Annual or perennial herbaceous plants or shrubs, the latter often prickly, usually producing an astringent watery sap. Leaves alternate, pinnate or palmate, rarely simple or undivided, stipulate. Flowers perfect, in more or less regular cymes or in corymbs. Calyx not attached to the ovary, persistent, rarely withering. Sepals five, rarely four, united below, often stipulate (the stipules in this case unite and form a calycul, or secondary or exterior calyx). Petals five, rarely four, free, caducous, uniform on a disk, imbricated like the sepals in prefloration. Stamens indefinite. Anthers introrse. Ovary free, consisting of an indefinite number of carpels, rarely few (one or two). Carpels with one ovule in each, rarely with two or several ovules. Ovules suspended or erect. Styles as many as the carpels, lateral, rarely terminal, free, rarely agglutinated in a column. Stigmas undivided. Fruit consisting of distinct carpels, usually indefinite, rarely few; carpels dry or drupaceous, one-seeded, not opening (many-seeded and opening in *Spiræa*), usually disposed in a head or on a hemispherical or conical receptacle, rarely

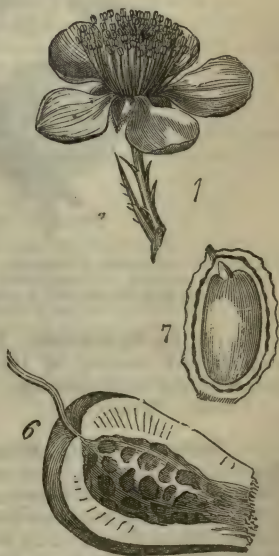


Fig. 187.—*Rubus discolor* (*fruticosus*).
1, Flower natural size; 6, a single carpel; 7, a single nut.

* There is much valuable matter on these ill-defined species in Dr. Bromfield's excellent "Flora Vectensis."

enclosed in the fleshy or ligneous tube of the calyx. Seeds suspended or erect, without albumen (perisperm). Embryo straight. Radicle directed towards the hilum.



Fig. 187.—*Rubus discolor* (fruticosus). 2, Vertical section of the flower, with the petals removed, showing the receptacles, the ovaries, styles, and stamens; 3, a single carpel, with style and stigma; 4, section of the ovule; 5, fruit, nat. size.

TRIBE I.—**Spirææ**. Carpels few, each two-six-seeded, in a single whorl, opening by the inner margin (the border nearest the axis or centre of the flower).

Genus.—*Spiræa*.

I. **Spiræa**, Linn. Meadow-sweet Dropwort. Perennial, herbaceous or ligneous plants, with pinnate, pinnatifid, lobed or entire leaves (segments often very unequal); stipules often very minute or absent. Flowers white or roseate, in many-flowered corymbs, or in spicate panicles. Calyx in five divisions, without a calycul (secondary calyx). Styles terminal, withering.

1. **S. Ulmaria**, Linn. Meadow-sweet. E.B. 960, L.C. 317. Stem erect, rigid, angular, smooth, branched above, leafy; leaflets ovate or slightly cordate at the base, with sharply toothed lobes, hoary or tomentose below, in four-five pairs, with alternate smaller or abortive ones, and with a dilated trifid terminal enlarged lobe; stipules lunulate, sharply toothed. Flowers in compound cymes. Petals roundish,

with linear claws, white. Carpels twisted, glabrous. In watery places. Perennial. June—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards. T. 51°—38°.

2. **S. Filipendula**, Linn. Dropwort. E. B. 284, L. C. 318. Roots furnished with fibres which terminate in fleshy tubers. Stems herbaceous, one-two-three feet high, erect, usually simple, with a few branches near the top. Leaves of the root numerous, of the stem few, with numerous leaflets (interruptedly pinnate), which are sessile, and slightly clasping; stipules toothed. Flowers white, in many-flowered, terminal corymbs. Carpels numerous, small, *conical, hairy or bristly*. On chalky or limestone open places. Perennial. June, July.

A. 14, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

3. **S. salicifolia**, Linn. Willow-leaved Spiræa. E. B. 1468, L. C. 319. This species is shrubby, four-five feet high, with numerous, erect, round, smooth, wand-like, leafy branches. Leaves oblong, lanceolate, on short petioles, serrated with mucronate teeth. Flowers small, in dense, branched, erect, terminal clusters, of a pale rose-pink, interspersed with small, hairy, deciduous bracts. Styles five. Frequent in shrubberies, apparently wild in hedges, in many parts of Wales and Scotland. (See "Phytologist," N. S., vol. i., pp. 8, 32, 297, 365, 366, 449.) Shrub. Flowers in June, July.

A. 12, C. ? Lat. 53° (?)—57°. Alt. ? T. ?

Woods near Dunkeld John Sim.

TRIBE II.—**Potentilleæ**. Carpels numerous, each one-seeded, not opening, either dry or succulent (drupaceous), on a dry or fleshy hemispherical or conical receptacle.

SYNOPSIS OF THE GENERA.

Potentilla. Carpels numerous, small; nuts on a flattish dry receptacle.

Sibbaldia. (See *P. Sibbaldia*.)

Comarum. (See *P. Comarum*.)

Fragaria. Carpels on a largely-developed *fleshy-succulent* receptacle.

Rubus. Carpels drupaceous, succulent, on a conical persistent receptacle.

Dryas. Calyx and petals eight-nine respectively; carpels on a dry receptacle.

Geum. Petals five; carpels tipped with the jointed styles, on a dry receptacle.

II. **Potentilla**, Linn. Perennial, herbaceous plants, sometimes shrubby at the base, rarely annual. Leaves pinnate or palmate or ternate; stipules entire or incised. Flowers yellow or white, in terminal, few-flowered, irregular cymes. Calyx in five, rarely in four, divisions, with a calycul (outer calyx) similarly divided. Petals obovate, round, or notched at the apex. Styles caducous. Carpels dry, on a convex, dry, hairy, persistent receptacle.

SECT. I.—*Fragariastrum*, D. C. Leaves digitate, trifoliate; flowers white.

1. **P. Fragaria**, Poir. *Fragaria sterilis*, Linn. Barren Strawberry. E. B. 1785, L. C. 333. *P. Fragariastrum*, Ehrh. Root almost

woody, oblique or horizontal, the rhizomes ending in a rosette of leaves, sometimes stolon-like. Stems one-four inches high, slender, spreading, about as long as the leaves. Leaves all ternate and petiolate; leaflets obovate or round and cuneate at the base, pubescent, silky beneath, toothed; the terminal tooth is shorter than the lateral ones. Flowers terminal, on long pedicels. Sepals lanceolate, tapering. Petals sometimes notched, scarcely so long as the calyx. Stamens on a brownish, hairy disk. On grassy banks and in woods. Perennial. March—May.

A. 17, C. 75. Lat. 50° — 58° . Alt. 0—700 yards. T. 51° — 40° .

2. **P. tridentata**, Sol. Three-toothed Cinquefoil. E. B. 2389, L. C. p. 16, List of Excluded Species. Root creeping, woody. Stems herbaceous, three-four inches high, round, hairy, slightly leafy, bearing three-four elegant white flowers. Leaves ternate; leaflets entire, except at the summit, which is equally toothed; lower stipules undivided, upper stipules cut. Calyx purplish, hairy, with uniform and equal segments. Petals obovate. Carpels hairy. Seeds ovate, turgid. On a mountain called Werron, and some other hills in Angushshire, to the westward. Mr. G. Don. From the "English Flora" of Sir J. E. Smith, vol. ii., p. 425. Perennial. May, June.

SECT. II.—Leaves digitate; leaflets three-five-seven.

§ 1. Flowers yellow.

3. **P. Tormentilla**, Nestl. *T. officinalis*, Linn. Common Tormentil. E. B. 863, L. C. 332. Roots thick, often woody. Stems numerous, slender, spreading or ascending, six-twelve inches high. Leaves ternate, rarely quinate; leaflets cuneate, deeply toothed, the terminal teeth being longer than the lateral teeth; radical leaves on long petioles, often decayed before flowering; stem-leaves sessile; stipules leaf-like, large, deeply toothed. Flowers rather small. Calyx in four, rarely in five, divisions. Petals four, rarely five, rather longer than the sepals. Carpels smooth when ripe. On heathy places, in dry or moist commons or pastures. Perennial. May—August.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—1100 yards. T. 52° — 36° .

I have a variety of this plant collected about Callander and other places in the Perthshire Highlands, which has very long linear-cuneate leaflets, with three-five very long spreading teeth or lobes. The stems are very long and prostrate, the flowers are on long pedicels. Is this *P. nemoralis*, Nestl.?

Var. β . *procumbens*. *Tormentilla reptans*, E. B. 864. Stem prostrate, elongate, round, hairy. Leaves all petiolate; leaflets obovate, regularly, closely, and sharply toothed; stipules not leaf-like nor divided, as in *P. Tormentilla*, with which it agrees only in the divisions of the calyx, and in the number of its petals. It differs in nothing from *P. reptans*, except in the number of the parts composing its floral envelopes.

4. **P. reptans**, Linn. Creeping Cinquefoil. E. B. 862, L. C. 331. Root thick, crowned with a rosette of leaves. Stems long, slender or filiform, prostrate and rooting at the joints. Leaves usually

in five divisions; segments (leaflets) *obovate or oblong, tapering and cuneate at the base*, serrated with numerous large teeth. Flowers solitary, lateral or opposite to the leaves, *on long pedicels*. Outer sepals (bracts) larger than the inner, sometimes incised. Petals longer than the sepals. Carpels, when ripe, slightly rough. Road-sides. Perennial. June—August.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

5. **P. alpestris**, Hall. Alpine Cinquefoil. E. B. 2193, L. C. 330. Roots rather woody, divided at the crown. Stems numerous, six-twelve inches high, ascending, branched, hairy, and leafy. Root-leaves quinate (in fives), rarely septenate (in sevens), with cuneate leaflets, which are more or less deeply cut in their upper half; stem-leaves ternate, nearly sessile; stipules *ovate, pointed*, entire or cut. Pedicels long, slender, hairy. Petals obcordate, much longer than the sepals. Carpels smooth, on a hairy receptacle. There is a more erect, smaller, and less hairy form of this plant. The flowers are larger and the carpels more numerous.* Mountains. Perennial. June, July.

A. 5, C. 10. Lat. 52°—57°. Alt. 200—900 yards. T. 46°—37°.

6. **P. verna**, Linn. Spring Cinquefoil. E. B. 37, L. C. 329. Stems prostrate, sometimes rooting, forming a close tuft (cushion?). Radical leaves five-seven, obovate, cuneate at the base, toothed only on their upper half; teeth spreading, *with prominent nerves on the under side*, of a light lively green; stem-leaves ternate or simple; stipules *of the root-leaves narrow, linear-subulate?* Pedicels filiform, hairy. Petals only a little longer than the sepals. Carpels *smooth*, on a hairy receptacle: In hilly and mountainous open places. Perennial. May.

A. 12, C. 25. Lat. 50°—57°. Alt. 0—250 yards. T. 50°—46°.

The petals are more veined in *P. alpestris* than in this species.†

7. **P. opaca**, Linn. Hairy Cinquefoil. E. B. 2449, L. C. Excluded Species, List C, p. 16. Root as in the preceding. Stems rigid, prostrate-ascending, branched, hairy, and leafy. Root-leaves septenate; stem-leaves quinate or ternate, sessile, with cuneate leaflets, which are cut or serrated almost to the base, larger, hairier, and of a lighter green than the leaves generally are in the two preceding species; stipules *lanceolate or linear, mostly entire*. Outer segments of the calyx *lanceolate, nearly as long as the inner* (the outer sepals are as long as the inner in some examples) ones, but not quite so broad. Petals scarcely longer than the calyx. Scottish mountains. Perennial. June.

8. **P. argentea**, Linn. Hoary Cinquefoil. E. B. 89, L. C. 328. Root rather woody. Stems several, erect, six-twelve inches high,

* In this species the leaves are acuminate, on short footstalks, singly or doubly serrated, teeth tipped with glands. Flowers three-four, on long, erect peduncles, in tufts, surrounded at the base of their stalks by brownish fringed or toothed involucre scales. Sepals ovate-oblong, obtuse, reflexed. Petals rounded.

† "How far *Potentilla alpestris* is distinct from *P. verna*, I will not attempt to decide; but the appearance is different, and its mode of growth much more loose and straggling."—Mr. Joseph Woods, in "Companion to Bot. Mag.," vol. i., p. 293.

leafy, slightly branched. Leaves stalked, consisting of five *narrow, deeply serrated or incised leaflets, which are cottony and white on the under side*, and dark green on the upper side; stipules lanceolate, tapering. Flowers in terminal, downy corymbs. Calyx white, like the under side of the leaflets. Corolla small. Receptacle hairy, seeds numerous. In gravelly pastures; not frequent. Perennial. June, July.

A. 14, C. 40. Lat. 50°—58°. Alt. 0—200 yards. T. 50°—47°.

§ 2. Leaves digitate; flowers white.

9. **P. Sibbaldia.*** *Sibbaldia procumbens*, Linn. E. B. 897, L. C. 324. Stems very woody, short, prostrate. Leaves ternate, petiolate; leaflets obovate or cuneate, with a three-toothed apex. Flowers bracteate, on short, stout, hairy stalks. Sepals triangular or lanceolate, hairy. Petals very small and fugacious, obovate, linear, greenish-yellow. Stamens few. Ben Lawers, and other alpine heights, on rocky spots. Perennial. July.

A. 4, C. 12. Lat. 56°—61°. Alt. 500—1400 yards. T. 41°—33°.

P. recta, Linn. Erect Cinquefoil, Fl. Dan., 11, 1820. Stem *quite erect, round, slender, hairy, branched only at the base and summit*. Leaves all stalked except the uppermost, digitate and quinate. Leaflets oblanceolate (cuneate-elongate), deeply incised, with erect blunt lobes or teeth, ribs prominent and hairy below; stipules entire, linear-lanceolate. Sepals linear-lanceolate, elongate, one or two of the outer series lacinate, the rest entire. Petals yellow, shorter than the sepals. On rubbish at Wandsworth, and near Parson's Green, Middlesex. Perennial. July—September.

mentosa? 10. **P. alba**, Linn. White Cinquefoil. E. B. 1384, L. C. Excluded Species, List C, p. 16. Root long and woody, branched at the crown. Stems scarcely as long as the root-leaves, very slender and hairy, branched, and with a few leaves. Root-leaves on long, furrowed, hairy stalks; leaflets quinate, oblong, nearly entire (a few teeth near the apex), the middle one much larger than the two lateral pairs, all slightly hairy above *and beautifully silvery and silky beneath*. Pedicels slender, hairy, bracteate. Flowers white. Calyx silky, outer segments nearly as long as the inner, but much narrower.

We have only Hudson's authority for the growth of this plant in Britain: "Habitat in Wallia, Per. Aug., D. Haviland." It has never been reported since; and may now, after a lapse of a hundred years, be deemed extinct as a British plant, if it ever had any claims to this rank. Kittel, in "German Flora," p. 650, informs us that it grows here and there in woods and hedges, especially in the south of Germany.

* Several eminent botanists have maintained the generic identity of *Sibbaldia* and *Potentilla*. In deference to these the plant has been described as a *Potentilla*. There are many other unnecessary divisions of genera; but it would be desirable that botanists of more influence than the writer of these descriptions should propose their discontinuance.

SECT. III.—Leaves pinnate.

§ 1. Flowers white.

11. **P. rupestris**, Linn. Strawberry-flowered Cinquefoil. E. B. 2058, L. C. 326. Root woody, tapering, with numerous fibres. Stems *erect, stout, round, leafy*, reddish, one-two feet high, branching, many-flowered. Leaves pinnate and lyrate, with seven-five-three leaflets, *on long leaf-stalks*; leaflets broadly elliptical, incised or toothed; whole plant hairy. Flowers large, white, like the flowers of the cultivated Strawberry (Sm). Calyx spreading, brown. Seeds smooth. On the sides of Craig Breidden, in Montgomeryshire. Perennial. June, July.

A. 1, C. 1. Lat. 52°—53°. Alt. 150—250 yards. T. 47°—46°.

§ 2. Flowers yellow.

12. **P. anserina**, Linn. Silverweed. E. B. 861, L. C. 327. Roots tapering, succulent. Stems *prostrate, slender, long, rooting*, and bearing *rosettes of leaves at the nodes* (knots or joints), which are usually distant. Leaves of fifteen-twentyfive leaflets, intermixed with very small, entire or incised smaller leaflets (interruptedly pinnate); leaflets green on the upper side, cottony, white on the under side, oblong, with pointed teeth; stipules *sheathing*, and divided towards the summit. Flowers large, solitary, on simple, mostly erect peduncles. Petals much longer than the calyx. Waysides, banks, and moist places; common. Perennial. June, July.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

13. **P. fruticosa**, Linn. Shrubby Cinquefoil. E. B. 88, L. C. 325. A *bushy shrub, about three or four feet high, leafy*. Leaves stalked; leaflets five-seven, oblong, acute, hairy, revolute at the margin, pale on the under side, the three terminal confluent; upper leaves ternate. Flowers terminal and aggregate, large and handsome. Greta Bridge, and other places in Teesdale. Perennial. June.

A. 3, C. 3. Lat. 54°—55°. Alt. ? T. ?

P. supina, Linn. Stem *round, hairy, reddish, much branched, procumbent, leafy*. Leaves pinnate, having two pairs of leaflets, with a *large, terminal, usually trifid lobe*; leaflets oblong, sessile, incised, with erect lobes or teeth, quite smooth on both sides; stipules entire or toothed (the lower are entire, the upper three-toothed). Flowers solitary, axillary, on slender, reflex pedicels, which are shorter than the leaves. Outer sepals longer than the inner, ovate, spreading; inner segments of the calyx triangular, pointed, erect, or embracing the fruit. Petals *not half so long as the calyx*. Segments obovate or cuneate, notched, bright yellow. Fruit very compact, hemispherical. Battersea Fields, on mud and soil. Annual? July, August.

SECT. IV.—Receptacle fleshy.

14. **P. Comarum**, Nestl. *Comarum palustre*, Linn. Purple Marsh Cinquefoil. E. B. 172, L. C. 334. Stems round, ascending, hairy, branched, reddish. Leaves elliptic-oblong, serrated with large pointed teeth, light green above, hoary below, pinnate; stipules leaf-like,

entire and rounded at the base, serrated, and sharply-pointed upwards. Outer calyx (calycine bracts) spreading, linear-lanceolate. Sepals (divisions of the inner calyx) ovate, acute, purple within, and usually of a dingy purple without, converging and covering the fruit. Seeds (carpels) numerous, easily detached from the enlarged, conical, fleshy or spongy receptacle. Peaty, boggy places; not common. Perennial. June, July.

A. 18, C. 70. Lat. 50° — 61° . Alt. 0—900 yards. T. 50° — 38° .

Note.—Differing from *Potentilla*, to which perhaps it ought to be joined by its enlarged, spongy receptacle.—Babington, "Manual," 2nd ed., p. 95.

III. **Fragaria**, Linn. Perennial plants, with thick, woody roots, which are invested with the dilated bases of the decayed leaves, throwing out numerous stolons (runners) which strike roots, and thus produce new plants. Leaves trifoliate, toothed, mostly radical, with stipules united to the petiole. Flowers white, in terminal cymes. Calyx five-parted, with a five-parted outer, spreading calyx (calycule). Receptacle ovate, much developed, fleshy, succulent.

F. vesca, Linn. Strawberry. E. B. 1524, L. C. 335. Stolons numerous. Stems four-eight inches high, naked, or with a solitary leaf under the flowers, usually about as long as the leaves. Leaves pubescent, white and silky underneath, with oblong or obovate leaflets, toothed and plicate before expansion, the terminal one usually shorter than the lateral ones. Petioles and pedicels hairy. Calyx spreading. Fruit red, ovate-globular. Woods and hedges. Perennial. May.

A. 18 (?), C. 81. Lat. 50° — 61° . Alt. 0—650 yards. T. 51° — 40° .

Var. β . *elatior*. *F. elatior*, Ehrh. Stems taller; leaves broader; the lateral leaflets often stalked; flowers larger than in the typical species, often abortive. Woods in the south of England; rare.

IV. **Rubus**, Linn. Bramble. Stems variable, but mostly shrubby, rarely herbaceous. Leaves compound. Flowers terminal, panicled or corymbose. Calyx five-parted; segments concave, pointed. Petals five, obovate. Stamens indefinite. Ovaries aggregate, with a nearly terminal style to each, placed on a spongy, conical receptacle. Fruit an agglomeration of one-seeded, juicy drupes. Seeds hard, wrinkled, pitted. These plants have long, usually arching, angular or round, prickly stems, which are of two years' duration (but some exceed this period); their fruit is acid, pulpy, mostly black, but sometimes crimson, or yellowish-white. They grow in temperate regions, and rarely between the tropics.

Note.—The range or area of the various so-called species of this genus is quoted from the third volume of "Cybele Brit.," p. 337; for which work it was written by Mr. Babington.

§ 1. *Suberecti*, Lind. Stem erect; leaves pinnate or digitate.

1. **R. idæus**, Linn. Raspberry. E. B. 2442, L. C. 339, 346 in

3rd ed. Stem erect or nearly so, round, tapering, with warts or rudimentary prickles. Branches rather erect, hairy, with slender prickles (*aciculi*). Leaflets of the barren stem ovate-acuminate, with broad, mucronate teeth; terminal leaflet cordate at the base; leaflets of the fertile stem small, all densely tomentose and white below; stipules setaceous. Sepals densely tomentose, with long, setaceous teeth. Petals erect, not exceeding the sepals. Fruit very pulpy. Heath, thickets. Perennial. May.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—650 yards. T. 50°—40°.

Var. *β. trifolius*, Dr. Bell Salter, in "An. Nat. Hist.," vol. xvi., p. 365. Stem polished; prickles few; leaves ternate.

Var. *γ. Leesii*, Bab. in "An. Nat. Hist.," vol. xvii., p. 169. Lees' Bramble. L. C. 339 b. Leaves ternate; lateral leaflets overlapping.

A. 1 (?). Devon and Somerset.

2. *R. suberectus*, Andr. Red-fruited Bramble. E. B. 2572, L. C. 340, 3. Stem rather erect, bluntly angular, slightly prickly, more or less hairy above (often quite smooth); prickles small, deflexed, variable, confined to the angles (?). Leaves green on both sides, and slightly hairy; leaflets obovate or elliptical, somewhat acuminate (oblong pointed), deeply and sharply toothed, some of them lobed; stipules lanceolate, fringed. Flowers in branched, spreading panicles. Sepals smooth and black or tawny externally, internally clothed with long, thick, white down (shaggy at the edges), reflexed in flower. Petals large, two or three times as large as the sepals. Fruit red. In woods and groves. Shrub. Perennial. July, August.

A. 9, C. 16 (?). Devon to Moray.

Var. *β. trifolius*. Leaves all ternate; fruit bright red.

Var. *γ. fissus*, Leight. Fl. Sh. 225. L. C. 340, 4. Prickles not confined to the angles, numerous and contiguous; calyx spreading, erect. (See "Phytologist," vol. iii., p. 72.)

3. *R. plicatus*, W. and N. Upright Blackberry. E. B. 2714, L. C. 340, 5. Stem nearly erect, angular, furrowed, glabrous, except at the top, prickly. Prickles on the angles of the stem, dilated at the base, curved, uniform, deflexed. Leaflets ovate-oblong, leathery, with prominent nerves and prickly midrib. Flowers in a spreading panicle or cluster, on long pedicels. Sepals lax, ovate-acuminate, densely tomentose on the inside. Petals large, conspicuous. Fruit nearly black. In damp and boggy places. Shrub. July—September.

A. 12, C. 22. Lat. 50°—57°.

Var. *β. carinatus*, Bell Salter in "An. Nat. Hist." vol. xvi., p. 365. Leaflets lanceolate, strongly keeled and veined below.

R. fastigiatus, W. and N. (?) Stems angular, glabrous, with few, equal, straight, deflexed prickles, which are confined to the angles of the stem. Leaflets cordate, acuminate, green on both sides, flexible, large, unequally toothed and serrated, downy and paler beneath. Panicle simple, elongate. Woods. Scotland. Shrub. August, September.

This is called a sylvan form of *R. plicatus* in the third edition of the "Manual;" in the fourth it is invisible.

§ 2. Stem glabrous or slightly hairy, with straight prickles and spreading hairs.

4. **R. incurvatus**, Bab. L. C. 340, 10. Stem angular, sulcate, slightly clothed with scattered hairs, and armed with distant, declining prickles. Leaflets ovate-acuminate, ending in a curved point, undulating, crisp, toothed, and serrated. Panicle leafy, long and flexuous. Peduncles downy and densely hairy. Sepals downy, incurved about the flowers and immature fruit. Thickets. Shrub. July? "Phytologist," vol. iv., p. 822.

A. 4, C. ? Lat. 51°—55°.

5. **R. imbricatus**, Hort. "An. of Nat. Hist." vol. ii. ser. vii., L. C. 340, 9. Stem angular, furrowed, purplish-red; prickles small, deflexed on a long (broad) base. Leaflets roundish-cordate, cuspidate, imbricate (overlapping each other). Panicle narrow, leafy below. Fruit roundish. Valley of the Wye, near Monmouth; plentiful. Shrub. June—August.

A. 1, C. 2. Lat. 51°—53°.

6. **R. rhamnifolius**, W. and N. Buckthorn-leaved Bramble. E. B. 2604, L. C. 340, 11. Stems angular, furrowed. Prickles uniform, straight, deflexed, on very broad bases; prickles on the petioles curved, much deflexed. Leaves ternate or quinate. Leaflets on the barren stems oblong or obovate, pointed, petiolate, lowest pair deflexed, of the fertile stem sessile, all ovate-oblong or rhomboid, finely and sharply toothed, more or less hairy on both sides, whitish below, green above. Flowers in rather dense paniced clusters; at the base dense and on short peduncles, on the upper part open and on long axillary peduncles. Sepals ovate, shortly acuminate, densely shaggy on both sides, reflexed, about half as long as the petals. Shrub. July, August.

"Cybele," No. 12. A. 10, C. 15. Lat. 51°—56°.

Var. *R. cordifolius*, W. and N., differs from *R. rhamnifolius* in its rather more flexible and greener leaves, terminal leaflet slightly cordate at the base, rounded, and shortly and sharply acuminate. This is rather a synonym of *R. rhamnifolius* than the name of a variety.

7. **R. affinis**, W. and N. Related Bramble. L. C. 340, 7. Stem angular, hairy; prickles slender, deflexed, slightly curved. Leaflets ovate, coarsely serrated, dark green above, paler beneath, more or less hairy on the under side. Flowers in a long, straggling panicle. Fruit of many large, black grains. Woods. Shrub. August (?).

"Cybele," No. 8. A. 11, C. 17. Lat. 51°—57°.

Compare Leighton in "Shropshire Flora," p. 226. This is entered in deference to the authors of the London Catalogue.

8. **R. Grabowskii**, Weihe (?). Grabowsky's Bramble. L. C. 340, 12. Stem glabrous, or slightly downy, with blunt angles; prickles numerous, slender, straight or hooked, much deflexed, slightly hairy at the base. Leaves of the barren stem quinate, of the fertile ternate, on petioles furnished with numerous strongly hooked prickles.

Leaflets shortly petioled, rounded, cordate at the base, shortly acuminate, unequally and finely serrated; teeth mucronate; midribs furnished with numerous strongly hooked prickles, glabrous above, pale green and slightly hairy beneath. Flowers in simple clusters; rach (common peduncle) very prickly; prickles very long, straight or hooked; hairs spreading, not numerous, except on the pedicels. Woods, &c. Shrub. August.

"Cybele," No. 13. A. 1. Leicester. Lat. 52° — 53° .

9. *R. nitidus*, W. and N. Shining-stalked Bramble, L. C. 340, 6. Stem quite smooth (*fere glabro* = almost smooth), with blunt angles, more or less prickly; prickles of the stem deflexed, not straight, compressed and dilated at the base. Leaflets all petiolate, ovate or obovate or oblong, more or less acuminate, slightly cordate at the base, doubly, coarsely and unequally toothed, glabrous above (on the upper surface), soft and downy underneath, green on both sides. Petioles both general and partial,* thickly armed with hooked, deflexed prickles, which extend along the midrib of the leaflets of the barren stem.

Note.—The lower pair of leaflets are stalked, and do not overlap the intermediate pair (Babington). Panicle prickly, composed of divergent, horizontal branches. Sepals whitish, densely shaggy, with short points. Petals twice as large as the sepals. Fruit small. Hedges and thickets. Shrub. July—September. (See "Phytologist," vol. iii., pp. 75, 360; vol. ii., pp. 101-2.)

A. 9, C. 16. Lat. 51° — 56° .

Var. *R. affinis*, W. and N. (See No. 7, L. C.) Stem angular, with rather stouter, more strongly curved prickles (?) than *R. nitidus*; leaflets more leathery, and rather tomentose on the under side; flowers in rather more erect, axillary corymbs; sepals more acuminate. (Compare "Phytologist," vol. iii., pp. 73, 325). See Leighton's "Shropshire Flora," where there is an elaborate description of this and the other Salopian Brambles. See p. 628.)

"Cybele," No. 8. A. 11, 17. Lat. 51° — 57° .

Var. *R. macrophyllus*, W. and N. E. B. 2625, L. C. 340, 21. Babington's "Manual," p. 101, 2nd ed. Stem angular, furrowed, very slightly hairy, shining, prickly; prickles nearly straight and nearly horizontal, those on the petioles deflexed, all much compressed and dilated at the base; leaflets large, rounded, with coarse, unequal, spreading teeth, green on both sides, and rather more cordate at the base; flowers in very lax leafy corymbs; sepals with longish, filiform points.

Var. *amplificatus*, Lees. Stem hairier, with more deflexed and rather stouter prickles; leaflets narrower, with more erect teeth; panicle not very open; sepals more acuminate.

Note.—The leaflets in this variety vary between broadly obovate and cuneate; the sepals are elongate and more tapering than in the preceding varieties. A var. of *R. macrophyllus*. (See Babington's "Manual," p. 101, 4th ed.)

* The general petiole supports the series of leaflets which compose the compound leaf; the partial ones only bear leaflets.

The forms in this group, viz. *rhamnifolius*, *nitidus*, &c., are distinguished by petiolate lower leaflets, which are always more or less declinate.

R. latifolius, Bab. L. C. 340, 8. Stem angular, furrowed, glabrous, purplish or green; leaflets very large, cordate at the base, rounded, acuminate, very broad; lower pair of leaflets overlapping.

A. 3, C. 3. Lat. 54°—57°.

See "Phytologist," vol. iv., p. 969, where Mr. Baker informs us that it is a connecting link between *R. corylifolius* and *R. nitidus*, as we understand the passage. He says that it is probably a luxuriant state of the former.

10. *R. Salteri*, Bab. Salter's Bramble. L. C. 340, 20. (See "Phytologist," vol. iv., p. 919, where it is described by Mr. Lees among the Cæsious Brambles.) Stem angular, furrowed, slightly hairy, with uniform, straight, deflexed prickles, which are confined to the angles of the stem. Leaflets ovate, pointed (apiculate), hairy above and downy beneath, not overlapping. Panicle compound, with lax hairs and no setæ. Apse Castle Wood, Isle of Wight. Shrub. July—September.

A. 3, C. 3. Lat. 51°—55°.

Var. *R. balfourianus*, L. C. 340, 35. Stem angular, slightly hairy, shining; prickles numerous, straight, or a little curved, horizontal; prickles of the petioles hooked and deflexed; lower pair of leaflets sessile and overlapping, ovate-rounded; terminal leaflet of the barren stem cordate, rounded, all with long, thick, shaggy down beneath, prominent, prickly midribs, and equal and mostly double serratures; flowers corymbose; sepals shaggy, large, with acuminate points.

11. *R. corylifolius*, Sm. Hazel-leaved Bramble. E. B. 827, L. C. 340, 36. Stem roundish, smooth, or slightly hairy, with one or two very blunt angles; prickles straight, uniform, horizontal, or very slightly deflexed; prickles on the petioles curved and deflexed. Lower pair of leaflets sessile, and consequently slightly overlapping the intermediate pair, slightly but decidedly declinate; terminal leaflet ovate or cordate at the base, oblong or rhomboid, sharply and unequally toothed, slightly hairy above, densely tomentose beneath. Flowers in lax corymbose panicles. Sepals shaggy, pointed. Woods and hedges. Shrub. July—September.

A. 8, C. 8. Lat. 50°—56°.

Var. *sublustris*, Lees. Whole plant green; prickles slender; leaflets more velvety below. (See Leighton in "Phytologist," vol. iii., p. 165.)

A. 8, C. 11. Lat. 51°—56°.

Var. γ . *Smithii* and δ . *intermedius*. (See "Leighton in "Phytologist," *ib.*) These two varieties are distinguished by their purplish stems furnished with numerous strong prickles and smaller leaflets. The var. δ is more prickly than var. γ .

§ 3. *Carpinifolii*. Stems slightly hairy; hairs spreading.

12. *R. carpinifolius*, W. and N. Hornbeam-leaved Bramble.

E. B. 2664, L. C. 340, 16. Stem stout, rounded, or angular; prickles strong, enlarged at the base, on the angles, when the stem is angular, deflexed. Leaflets usually petiolate; lower pair declining, sometimes nearly sessile and declinate, and slightly overlapping, often cuneate (tapering) at the base, oblong or rhomboid; terminal leaflet of the barren stem rounded, obovate, or somewhat rhomboid, cordate at the base, and shortly and sharply acuminate, both sides of the same colour, rather coriaceous above, slightly hairy beneath. Flowers terminal or axillary, on horizontal or erect branches. Sepals ovate, with short points, shaggy on both sides, reflexed. Petals usually of a light pink colour. Fruit small. Woods and hedges. Shrub. July—September.

A. 14, C. 22. Lat. 50°—57°.

R. macrophyllus, W. and N. Long-leaved Bramble. E. B. 2625, L. C. 340, 21. Stem angular, hairy, with several straight prickles. Leaflets elliptical ovate, lowest pair not overlapping, doubly serrated with long points, downy or hairy beneath. Panicle compound, with ascending branches. (Babington, "Manual," p. 161.) Woods and hedges; not common. Shrub. July—September.

A. 11, C. 19. Lat. 50°—56°.

13. *R. pampinosus*, Lees; *villicaulis*, W. and N. L. C. 340, 18. Stem angular, polished, with short inconspicuous hairs, and many small declining prickles. Leaflets ovate or cordate-ovate, large, thin, flexible, with coarse serratures. Panicle very long. Sepals densely hairy, loosely reflex in flower and fruit. In dense thickets. Shrub. July? (Compare "Phytologist," vol. iv., p. 822.)

A. 9, C. 16. Lat. 50°—56°.

14. *R. sylvaticus*, Leighton's fasc. 340; *mucronatus*, Blox. fasc. Sylvan Bramble. L. C. 340, 19. Stem angular or rounded, furrowed, smooth; prickles few, small. Leaves ternate or quinate; leaflets rounded, obovate or oblong, pliant, nearly of the same colour and slightly hairy on both sides, equally and deeply toothed, slightly and abruptly acuminate. Panicle simple, few-flowered; rach and pedicels hairy and glandular, with few prickles. Woods? Shrub. July—September.

Note.—In the third edition of the "Manual" this species was divided between three, or formed part of *R. villicaulis*, *R. mucronatus*, and *R. calvatus*; in the fourth edition the latter species has been hung on to *R. Salteri*, with the candid observation, that they seem to be the extremes of one species.

R. humifusus, W. and N. (See "Phytologist," vol. iv., p. 293.) E. B. 2664. Stem procumbent; prickles and aciculi numerous, slender, often gland-tipped. Leaves ternate or pedate-quinate; leaflets cordate-acuminate, doubly and unequally serrated. Branches of the panicle appressed, thickly clothed with setæ, aciculi, and gland-tipped prickles. Sepals lanceolate, setose, prickly. Woods and thickets; very rare. Shrub. June—August.

This was collected long ago under a dense growth of Brambles, &c., in a shady lane at Bellsizes House, near Hampstead. This loca-

lity no longer exists; the place does; but the shady path has shared the fate of Hag-bush Lane. (See "Every Day Book," p. 870.)—A. I.

15. **R. Sprengelii**, W. and N. Sprengel's Bramble. L. C. 340, 22. Stem rounded or angular; prickles small, straight or hooked, deflexed. Leaves ternate or quaternate, thin, of the same colour on both sides, smooth; leaflets cuneate at the base, oblong-ovate, lower pair on short petioles, with large, sharp teeth. Flowers in close, terminal, and axillary clusters; rach glandular, hairy, with a few long, slender prickles. Sepals acuminate, nearly as long as the petals. Fruit enclosed in the calyx. Woods. Shrub. July, September.

A. 8. C. 13. Lat. 51°—55°.

Var. *R. Borreri*, Bell Salter, "An. Nat. Hist.," vol. xv., p. 306. Stem rounded or angular; prickles slender, deflexed, unequal. Leaves of barren stem quinate, of the same colour on both sides. Leaflets oblong-obovate, deeply and sharply toothed or doubly toothed, lower pair not overlapping (?). Flowers in branched, compact panicles; rach shaggy, glandular (?). Sepals ovate, pointed, very shaggy.

16. **R. leucostachys**, Sm. *R. vestitus*, W. and N. White-clustered Bramble. E. B. 2631, L. C. 340, 15. Stem angular or rounded, clothed with white hairs or down; prickles straight, horizontal, strong, equal, hairy, and enlarged at the base. Leaves quinate, leathery, smooth and green above, soft and whitish below, shaggy or tomentose, always with white, shining hairs; leaflets petioled, the lowest pair deflexed, obovate or oblong, pointed, sharply serrated, with mucronate teeth. Panicle branched and leafy below, more or less dense and narrow above. Pedicels shaggy, with long and short hairs interspersed with a few setæ and glands. Fruit purplish-black.

A. 10, C. 19. Lat 51°—56°.

Var. *vestitus*. Leaves more or less pliable, slightly hairy above, shaggy or tomentose below; leaflets more rounded than in the type. Sepals hairy, glanduliferous.

Var. *villicaulis*. Stem rather more densely hairy. Leaflets obovate or oblong.

Var. *argenteus*. Stem angular, very shaggy. Leaves oblong-obovate, white below. Sepals shaggy, armed with prickles.

Var. *R. Leightonianus*, Bab. Stem angular or rounded, hairy, with straight, slightly deflexed prickles, which are on a dilated, hairy base. Leaflets thin, roundish, doubly toothed, pale green and hairy beneath. Panicle with rather distant, spreading branches, densely clothed with hairs and setæ (bristles bearing glands). Compare "Phytologist," vol. iii., p. 176, where the Rev. W. A. Leighton clearly shows that this is neither a species nor even a variety, but the veritable *R. leucostachys*, var. *vestitus*. Entered in deference to the learned authors of the "London Catalogue."

§ 4. *Tomentosi*. Stem angular, with concave sides, more or less clothed with silky hairs; prickles mostly on the angles of the stem, stout, clothed at the base with silky down (pubescence). Leaves of the barren stem quinate,

of the fertile one ternate or quinate, white or hoary below. Flowers usually in leafless, downy panicles.

17. **R. discolor**, W. and N.; *fruticosus*. E. B. 715, L. C. 340, 14. Two-coloured-leaved Bramble. Stems glaucous, with minute, silky hairs; prickles stout, mostly hooked, of the same colour as the stem, except at the tops, where they are yellowish-brown, and without down (tomentum). Leaflets all petioled, not overlapping, cuneate, oblong, or obovate, pointed, serrated (teeth unequal), glabrous above, white and downy below. Flowers in compound or simple clusters; rach and branches downy. Sepals ovate, with short points. Petals varying from pure white to deep red. Very common in hedges. Shrub. July, August.

A. 9, C. 21. Lat. 41° — 55° . 5/ 82

Var. *β. thyrsoides*, Bab. L. C. 340, 13. Stems and prickles glabrous, nearly without pubescence. Leaflets more elongate and not so leathery nor so white below as in the typical form; panicle closer and more elongate. (Compare "Phytologist," vol. iii., p. 182.)

A. 5, C. 12. Lat. 51° — 54° .

Var. *γ. macroacanthus*, Bell Salt. Stem greenish, rough, with spreading hairs and long slender prickles; leaflets broad, rounded, coarsely toothed, teeth mucronate, hoary below.

Var. *argenteus*. L. C. 340, 13 b. Stem purplish, with fewer spreading hairs; prickles more hooked or declinate, not clothed half way up with shaggy hairs. Leaflets petioled, obovate, with unequal teeth, hoary below. Flowers in compound clusters. Sepals shaggy.

Var. *villicaulis*. Stem hairy or woolly. Leaflets obovate, sharply serrated, not so tomentose underneath as the above forms of *discolor*. Nearer to *R. leucostachys* than to *R. discolor* (?).

A. 9, C. 16. Lat. 51° — 55° .

§ 5. Stems hairy.

18. **R. rudis**, Weihe. Rough Bramble. L. C. 340, 26. Stem angular, furrowed with numerous setæ and aciculi (small prickles); prickles equal, nearly straight, deflexed, long and slender, more or less enlarged, and slightly hairy at the base. Leaflets petiolate, with strongly-hooked prickles on their midribs, ovate-acuminate, coarsely and doubly serrated, pale green and hairy below. Panicle open and branching towards the base, dense above, leafy throughout. Sepals ovate-acuminate, with long leaf-like points. Petals longer than the sepals. Bushy places. Perennial. Shrub. July.

A. 10, C. 20. Lat. 51° — 56° .

19. **R. pallidus**, W. and N. L. C. 340, 27. Stem angular, armed with distant prickles, copiously fringed with hairs, setæ, and aciculi. Leaflets elliptical, obovate; narrowed at the base, bright-green above, pallid beneath. Panicle broad, hairy, and setose. Woods. Shrub. July (?).

A. 12, C. 15. Lat. 51° — 57° .

Var. *Leightonii*. Prickles more flattened. Leaflets stalked, distinct, obovate, or oblong, shortly acuminate. Panicle spreading, leafy

below. Besides this, there are several varieties of this form, viz., *Reichenbachii*, with round leaflets; *denticulatus*, with shallow teeth; *attenuatus*, leaflets with long tapering points.

20. **R. pyramidalis**, Bab. Pyramidal Bramble. L. C. 340, 30. Stem angular or rounded, armed with many short, strong prickles, which are enlarged at the base, intermixed with a few aciculi, setæ, and hairs. Leaflets hairy on both sides, toothed and serrated. Panicle pyramidal, leafy below; rach straight, rigid. (Babington.) Woods(?). Shrub. July(?).

A. 3, C. 4. Lat. 51°—54°.

21. **R. Guntheri**, Weihe. Gunther's Bramble. L. C. 340, 31. Stems rounded or angular, with flat sides, hairy and glandular; prickles unequal, usually small, straight and declining. Leaves ternate or quinate; leaflets petioled, cordate at the base, rounded, ovate, obovate, or oblong, sometimes green on both sides, sometimes nearly white below, teeth of the serratures mucronate. Flowers numerous, in branching panicles, clustered and leafy below, dense and leafless above. Sepals reflexed, densely shaggy, prickly, with short, callous tips (points). Woods. Perennial. Shrub. August.

A. 3, C. 5. Lat. 51°—53°.

R. Babingtonii, Bell Salt. Babington's Bramble. Stem angular, with concave sides, hairy; glandular in the variety β . *Bloxamii*; prickles declining, strong, short, hairy and enlarged at the base. Leaves mostly ternate, hairy on both sides; leaflets broad, obovate, unequally toothed or lobed, with short, abrupt points. Panicle spreading, on long, leafy, very prickly branches, scarcely glandular, very hairy. Sepals densely shaggy. This form or species has degenerated into a var. of *R. Hystrix*, W.; the var. *R. Bloxamii* has advanced a step. (See *infra*.)

A. 6, C. 9. Lat. 51°—54°.

22. **R. Bloxamii**, Lees. L. C. 340, 23. Stem sulcate, with numerous aciculi and setæ (prickles?). Leaflets soft and green, hairy on both sides. Panicles very long. (Compare "Phytologist," vol. iv., p. 921.)

23. **R. Kœhleri**, Weihe. Kœhler's Bramble. L. C. 340, 28. Stem angular, with flat, ridged sides; prickles very unequal, usually small, hooked or straight, declining. Leaves quinate, on prickly stalks, prickles strongly hooked, smooth above, soft and hairy below; leaflets obovate, pointed with scalloped margins and long mucronate teeth, lower pair deflexed. Panicles leafy below, clusters on downy, hairy, prickly, glandulous, short branches. Sepals lanceolate, pointed, densely downy, nearly as long as the narrow, clawed petals. Woods, hedges, and bushy places. Perennial. Shrub. July, August.

A. 9, C. 15. Lat. 51°—56°.

Var. *fusco-ater*. L. C. 340, 29. Stem very prickly; prickles rather stronger than in the type, mostly straight, deflexed; lowest pair of leaflets on or attached to the petioles of the central pair.

Var. *fuscus*. Leaves more coriaceous, more rigid, and less hairy below than in the typical form; petioles and midribs red; prickles,

aciculi, and setæ reddish; hairs white. A var. of *R. glandulosus*. ("Manual," p. 105).

A. 3, C. 3. Lat. 52°—53°.

24. *R. hirtus*, W. and N. Hirsute Bramble. L. C. 340, 32. Stem angular, furrowed with long, spreading hairs, and with aciculi, setæ, and slender, unequal, deflexed, nearly straight prickles. Leaves pliant, nearly of the same colour on both sides; leaflets mostly petioled, ovate-lanceolate or rounded and shortly acuminate, nearly equally serrated with longish, mostly ascending teeth. Panicle leafy below. Sepals hairy and glandular without. Petals elliptical, longer than the sepals. Woods. Shrub. July, August.

A. 3, C. 6. Lat. 51°—55°.

Var. *foliosus*, W. and N. Leaves ovate or obovate, coarsely and doubly toothed; lower pair of leaflets slightly overlapping the intermediate pair. Fruit small.

25. *R. scaber*, Weihe. Scabrous Bramble. L. C. 340, 34. Stem angular, furrowed with deflexed, very unequal prickles, intermixed with aciculi (pricklets) and setæ (glandular hairs). Leaflets ovate or obovate, sharply serrated with mucronate teeth, rigid, smooth, with only a few scattered hairs on the under side. Panicle spreading, with long, horizontal branches. Sepals lanceolate. Fruit small. Woods. Shrub. July (?)—September.

A. 4, C. 5. Lat. 51°—54°.

26. *R. Bellardi*, W. and N. Bellard's Bramble. L. C. 340, 33 a. Stems rounded, armed with prickles, aciculi, and in the upper part densely hairy or shaggy; prickles small, unequal, straight, slender; hairs spreading, dense on the petioles. Leaves ternate; leaflets rounded or obovate-oblong, sharply serrated with mucronate teeth. Panicles compound, branched, more or less dense; rach shaggy, with glandular hairs. Sepals narrowly lanceolate, spreading. Woods and hedges. Shrub. July, September.

This is now a var. of *R. glandulosus*.

A. 4, C. 6. Lat. 51°—55°.

27. *R. glandulosus*, Bellardi. Glandular Bramble. E. B. 2883, L. C. 340, 33. Stem slightly angular or rounded, furrowed, hairy-glandular; prickles slender, unequal. Leaves ternate, in *γ. rosaceus*, quinate, deep green on both sides, more or less hairy; leaflets petioled, lower pair on the barren stem declinate, none overlapping; terminal leaflet ovate or obovate, or oblong, all with sharp, unequal teeth. Panicle branched, leafy below; rach hairy-shaggy, with numerous setæ (bristles bearing glands), and very unequal, slender prickles. Sepals lanceolate, glandular, and armed with small prickles (aciculi). Rare. Shrub. July, August.

Area and range as in No. 26.

Var. *β. Lejeunii*, Bell Salter. "Phytologist," vol. ii., p. 135. Leaves of barren stem ternate, pliant, deep green, finely but unequally serrated, one of the leaves subtending a branch of the panicle is broadly cordate, and one or two broadly ovate or narrowly ovate, less glandular than the typical form.

Var. *γ. rosaceus*. Leaves of the barren stem quinate, the lower pair of leaflets deflexed (none overlapping); leaflets ovate or oblong, unequally and coarsely serrated. Rach and pedicels densely shaggy, glandular and prickly.

Var. *δ. dentatus*. Babington's "Manual," 2nd ed. Leaves of barren stem ternate; leaflets obovate-oblong, cordate at the base, with short, abrupt points, finely and unequally serrated.

28. **R. Radula**, W. and N. Hairy Bramble. L. C. 340, 25. Stem angular and rounded, furrowed, hairy, glandular, and prickly; hairs spreading, glands on longer or shorter setæ; prickles not uniform, deflexed, and hooked. Leaflets of barren stem elliptical-oblong, of the fertile stem sessile or subsessile, obovate, finely and unequally serrated, with ascending teeth, mucronate, of a paler colour, and hairy and soft below. Flowers in panicles, leafy below, in a simple cluster above; rach hairy, with a few long prickles. Sepals ovate-acuminate. Petals large. Hedges and woods. July, August.

A. 11, C. 15. Lat. 50°—56°.

Var. *Hystrix*, W. and N. L. C. 340, 24. Stems less hairy; leaflets elliptical-oblong; sepals longer and more acuminate than in the type.

A. 8, C. 13. Lat. 50°—56°.

Var. *foliosus*. Leaflets broader than in *R. Hystrix*; panicle leafy throughout.

Var. *Lingua*, Weihe; *scaber*, W. and N. (?). Stem rounded or slightly angular; prickles nearly equal, small, deflexed, with numerous aciculi, glands, and spreading hairs. Panicle very open, on long, spreading branches or peduncles. Sepals glandular and pointed.

29. **R. nemorosus**, Hayne. *R. dumetorum*, W. and N. Bramble of the Bushes. L. C. 340, 37. Stems bluntly angular or round, with numerous prickles, aciculi, hairs, and glands; prickles very unequal, mostly straight and horizontal. Leaves imperfectly quinate, hairy, and of the same colour on both sides; leaflets obovate, or oblong or rounded, somewhat cordate at the base, acuminate, coarsely or finely, or simply or doubly toothed, paler and softer on the under side. Panicle compound, spreading. Sepals reflexed in flower, embracing the fruit when quite ripe. Petals large and showy. Hedges and woods. July, August.

A. 9, C. 13. Lat. 50°—55°.

Of this there are numerous varieties, characterized by their names, viz., *glabratus*, *bifrons* (leaves with two colours, a common character in this genus), *pilosus*, *horridus*, &c.

§ 6. *Cæsii*. Stems and fruit more or less glaucous.

30. **R. cæsius**, Linn. Dewberry. E. B. 826, L. C. 340, 38. Stem round; barren stem angular, rounded, glaucous, furnished with prickles, glands, and hairs; prickles variable, straight or declining. Leaves ternate, those on the barren stem quinate or ternate, with lateral external lobes on the lower pair; leaflets (lower pair) nearly sessile, overlapping, ovate-acuminate, deeply and unequally toothed.

Panicle nearly simple; rach and pedicels prickly, glandular, and hairy. Sepals ovate-elongated, with short points, embracing the fruit. Petals obovate. Fruit glaucous, with more or less of a bluish tint. Hedges. Flower, June. Fruit, August.

A. 14, C. 30. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

R. tenuis. Stem weak, without hairs and setæ (?).—Dr. Bell Salter.

A. 10, C. 17. Lat. 51°—55°.

31. **R. Wahlbergii**, Arrh. Wahlberg's Bramble. Stem rounded, angular, glaucous, downy, with numerous long, nearly equal, straight or curved prickles, enlarged and hairy at the base; barren stem angular, furrowed with strong, decidedly hooked, and declinate prickles. Leaves quinate, rather thick, slightly hairy above, downy and whitish or grey below, with prickly petioles; leaflets roundish, abruptly pointed, cordate at the base, unequally serrated, the lower pair (when the leaf is quinate) deflexed and not overlapping. Panicle branched and leafy below, prickly, downy, and slightly glandular. Sepals spreading. Fruit large, dark purple. Hedges in the south of England. Shrub. August.

Note.—The plants called *R. Wahlbergii* are now referred, in the "Manual," to *R. corylifolius* and *R. nemorosus*.

A. 3, C. 4. Lat. 51°—53°.

Var. *R. aquaticus*, W. and N. Stems long and slender, with very few and small prickles. Flowering branches erect, slender, acicular and glandular, scarcely prickly. Flowers few, on filiform, glandular pedicels. This does not appear in the fourth edition of the "Manual."

Note.—The Dewberry Brambles have a tendency to produce numerous erect branches, originating in the same joint; these branches are often abortive, a tuft of scaly sheaths and leaves only remaining to indicate the usual places of their growth.

§ 7. Stems half-shrubby, not prickly.

32. **R. saxatilis**, Linn. Rock Bramble. E. B. 2233, L. C. 338. Stem erect, with (usually) a few minute prickles. Leaves ternate, on long, hairy, prickly petioles; leaflets ovate-elliptical, tapering at both ends, serrated, downy. Flowers few, in a corymb, yellow. Fruit one-four large red drupes. Near Settle, Yorkshire. In mountainous, stony places. Shrub. July—September.

A. 14, C. 40. Lat. 51°—61°. Alt. 0—900 yards. T. 46°—38°.

33. **R. Chamæmorus**, Linn. Cloud-berry. E. B. 716, L. C. 337. Stems creeping underground, flowering-shoots erect, unarmed, herbaceous, six-ten inches high. Leaves simple, five-seven-lobed. Lobes short, obtuse, plaited, toothed. Petals white. "True stem underground, creeping, woody."—Mr. Babington. Turfy bogs on lofty mountains. Perennial. July, August.

A. 11, C. 30. Lat. 53°—59°. Alt. 200—1100 yards. T. 43°—36°.

R. arcticus, Linn. Arctic Bramble. E. B. 1585, L. C. Excluded Species, p. 16. Stem erect, one-flowered. Leaves ternate. Petals

purple. Isle of Mull and on Ben Ghlo (?). Has long disappeared (?).

Hooker and Arnott separate the *Rubi* into three sections, containing as below :—

SECT. I. *R. idæus*.

SECT. II. *R. suberectus*, *R. fruticosus*, *R. rhamnifolius*, *R. carpinifolius*, *R. corylifolius*, *R. glandulosus*, *R. cæsius*.

SECT. III. *R. saxatilis*, *R. arcticus*, *R. Chamæmorus*.

These judicious authors state, in a note (see Hooker and Arnott's "British Flora," p. 122, 7th ed.), that all the *Rubi* comprehended in Sect. II. are mere varieties, approaching on the one side to *R. idæus*, and on the other to *R. saxatilis*, with both of which many fertile and permanent hybrids may have been formed, and are still forming.

The following is Dr. Bell Salter's arrangement, which is a modification of what may be called the modern views, represented in this country by Mr. Babington and his followers :—

Under the Group I. SUBERECTI, Lindley, are described three forms—*R. idæus*, *R. suberectus*, *R. plicatus*.

Group II. CORYLIFOLII—*R. rhamnifolius*, *R. macrophyllus*, *R. corylifolius*, *R. Salteri*.

Group III. CARPINIFOLII—*R. carpinifolius*, *R. Sprengelli*.

Group IV. TOMENTOSI—*R. discolor*, *R. argenteus*, *R. leucostachys*.

Group V. RADULÆ—*R. Radula*, *R. rudis*.

Group VI. KÖHLERIANI—*R. Guntheri*, *R. Kæhleri*, *R. humifusus*, *R. hirtus*, *R. glandulosus*.

Group VII. CÆSII—*R. Wahlbergii*, *R. nemorosus*, *R. cæsius*.

Group VIII. HERBACEI—*R. saxatilis*, *R. arcticus*, *R. Chamæmorus*.

V. Dryas, Linn. Perennial, herbaceous plants, with simple, short, leafy stems. Leaves simple or compound. Flowers large, solitary, terminal. Calyx eight-ten-parted or cleft, in one row. Petals eight-ten. Stamens indefinite. Carpels (achenia) ovate-oblong, with long feathery appendages, on a depressed, downy, minutely cellular receptacle.

D. octopetala, Linn. Mountain Avens. E. B. 451, L. C. 320. Roots woody, widely spreading. Flowering-stems very short, with tufts of leaves at their base; barren stems prostrate or ascending, leafy. Leaves oblong, blunt, deeply serrated, shining and green above, white below, or very downy. Petioles persistent. Stipules linear, setaceous, hairy. Flowers white, solitary, terminal, on long hairy stalks. Sepals eight, rarely ten or six, lanceolate, uniform. Petals obovate, as many as the sepals (divisions of the calyx). Styles densely feathery, with long silky down. Yorkshire, Craven district, mountainous parts of England and Wales, Scotland, and Ireland. Perennial. July, August.

A. 5, C. 9. Lat. 54°—60°. Alt. 0—900 yards. T. 46°—38°.

Note.—This interesting plant has only recently been satisfactorily ascertained to be an occupant of the lofty mountains of Glyder Fawr,

Carnarvon, North Wales. (See "Phytologist," January, 1858, vol. ii., p. 313.)

VI. Geum, Linn. Herbaceous, perennial, thick-rooted plants. Root-leaves pinnate, with unequally lobed or toothed or incised segments; the terminal lobe large, the lateral very small; stem-leaves usually ternate; stipules large, leaf-like. Flowers solitary, yellow, or red, or purple. Calyx in five divisions, with an outer calyx consisting of five bracts. Styles terminal, *very much elongated after flowering*, each *hooked* (bent or twisted) *at about one-third of its length from the point*, the terminal joint falling off (caducous). Carpels dry, hairy, in a globular head, and arranged on a cylindrical receptacle.

1. **G. urbanum**, Linn. Herb Bennett, or Common Avens. E. B. 1400, L. C. 321. Root short, truncate. Stems branched, rarely simple, erect or nearly so, round, hairy and leafy. Leaves petiolate, with *ternate, pointed, terminal lobes*. Calyx *green, reflexed some time after flowering*. Petals obovate, rounded at the apex. Carpels sessile at the bottom of the calyx, upper joint of the style nearly glabrous. Hedges, woods, and moist shady places. Perennial. June, July.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—150 yards. T. 52°—47°.

2. **G. intermedium**, Ehrh. Intermediate Geum. L. C. 321 b, Fl. Dan., p. 1874. Root elongate. Stems branching, rarely simple (?). Flowers *drooping*. Sepals reddish, horizontal after flowering, not reflected as in *G. urbanum*. Petals abruptly contracted into a sharp claw. Carpels sessile at the bottom of the calyx. By this character, viz., the absence of the carpophore (fruit-stalk), and by the spreading, not erect sepals, it is distinguished from *G. rivale*. Woods and moist shady places. Perennial. May—August. *Marrymill den, near Perth*.
Area and range undetermined.

3. **G. rivale**, Linn. Water Avens. E. B. 106, L. C. 322. Root rhizomatous, elongated. Stems erect, branching, twelve-eighteen inches high, hairy, leafy. Flowers pendulous. Calyx reddish, very hairy, *erect after flowering*. Petals broad, cuneate, with long claws. Carpels *on a round stipitate head* (on a stalk rising from the base of the calyx), upper joint of the style furnished with long spreading hairs. In moist grassy places, woods, river-banks, &c. Unfrequent in the south and middle of England. Perennial. May—July.

A. 18, C. 70. Lat. 50°—60°. Alt. 0—950 yards. T. 50°—37°.

TRIBE III.—**Roseæ**. Carpels numerous, one-seeded, dry, not opening, enclosed in the calyx-tube, which enlarges after flowering, and is fleshy when ripe; stamens indefinite.

Genus.—*Rosa*.

VII. Rosa, Linn. Rose. Shrubs often with creeping roots. Stems prickly. Leaves compound, with singly- or doubly-toothed leaflets; stipules laterally attached to the petioles. Flowers large, solitary or aggregate, axillary or terminal. Calyx-tube urceolate

constricted at the top, increasing after flowering, and fleshy when ripe, the inner surface lined with rough hairs; limb in five rarely entire divisions. Corolla imbricated before flowering (when in bud). Styles with lateral insertion (not on the centre of the ovary), either free or united above. Carpels numerous, bony, irregular in shape, covered with hairs, inserted on the inner side of the calyx-tube.

SECT. I.—Carpels stipitate, at least the central ones; stipes about as long as the carpel.

§ 1. *Canina*. Root-shoots arched; prickles uniform, hooked; leaflets ovate, without glands; divisions of the calyx deciduous, the throat surrounded by a thick, elevated disk.

R. canina, *R. bractescens*, *R. cæsia*.

1. ***R. canina***, Linn. Dog-Rose. E. B. 922, L. C. 351. Stems much branched, spreading; prickles of the old wood *nearly equal, robust, enlarged, and compressed at the base, abruptly terminating in a hooked point*. Leaflets five-seven, ovate or oblong, doubly toothed, *the upper teeth almost connivent*; stipules of the floral leaves dilated, erect. Flowers white or pale rose, mostly solitary. Divisions of the calyx pinnatifid, reflexed after flowering. Fruit ovate-oblong or globular. Flower, June. Fruit, August—November.

A. 18, C. 81. Lat. 50°—61°. Alt. 0—450 yards. T. 52°—42°.

There are several varieties and sub-varieties of this Rose, viz. :—

R. bractescens, Woods. Bracteated Dog-Rose, Woods, in “Linn. Trans.” Prickles hooked. Leaflets simply serrated, downy beneath; bracts overtopping the fruit. Calyx-tube round. Styles woolly. Fruit round. Westmoreland. Shrub. June, July. Apparently a variety of *R. canina*, Hooker and Arnott.

The two following are described as species by some botanists :—

R. systyla, Sm. United-styled Rose. E. B. 1895, L. C. 352. Leaflets five-seven, with simple serratures. Sepals nearly entire. *Styles united*. Fruit elliptical, smooth (?). (See Sect. II., § 2, *infra*.)

R. cæsia, Sm. Glaucous-leaved Dog-Rose. E. B. 2367, L. C. 351 g. A much-branched shrub. Prickles strongly and uniformly hooked, numerous. Leaflets five, serrated and glandular at the edges, smooth or downy. Stipules large, with short, broad tips. Calyx-divisions sparingly pinnatifid. Fruit elliptical, smooth.

Var. *β. incana*. Prickles strongly uncinatè, from a much lengthened base, Hooker and Arnott, who say, “We do not distinguish this from *R. canina*.”

The area, range, &c., of these varieties have not yet been determined.

β. R. sarmentacea, Woods. E. B. 2595. Leaflets keeled, smooth. Calyx-divisions long, pinnatifid. Fruit elliptical, with a longish collar.

γ. R. surculosa, Woods. Leaflets flat, smooth, with unequal serratures.

δ. R. dumetorum, Woods. E. B. 2610. Leaflets simply serrated,

hairy, with glandular petioles and stipules on very short stalks. Fruit oblong-elliptical, with a short collar.

ε. *R. Forsteri*, Sm. E. B. 2611. Leaflets more or less folded. Fruit ovate-roundish, with a short, tapering collar.

§ 2. *Rubiginosa*. Root-shoots arched, with unequal prickles; leaves glandular; calyx-divisions persistent, throat with a more or less thick disk.

R. sepium, *R. rubiginosa*, *R. micrantha*, *R. inodora*.

2. *R. sepium*, Thuil. Small-leaved Sweet-Briar. E. B. 2653, L. C. 350*. Shrub three-four feet high, with numerous large and hooked and small straight or subulate prickles, interspersed with setæ (bristles). Leaflets five-seven, serrated, *glandular on both margin and disk*. Divisions of the calyx mostly entire (simple), glandular at the margin. Fruit smooth, ovate-elongate, with a *longish thick neck, crowned by the diverging divisions of the calyx*. Midland counties. Shrub. June.

For area, &c., of this and the two following, see *R. rubiginosa*.

3. *R. inodora*, Fr. Scentless Briar. E. B. 2759, L. C. 348. Stout shrub. Prickles equal, hooked, with very broad bases. Petioles and stipules bristly, the former prickly, the latter with a short, abrupt point. Leaflets five-seven, slightly glandular, doubly and deeply serrated. Bracts leaf-like and pinnatifid. Peduncles bristly and prickly. Divisions of the calyx pinnatifid, with linear, serrated lobes. Fruit ovate-oblong, smooth, with a *short neck, not crowned by the calyx-divisions*. Hedges. June, July.

4. *R. micrantha*, Sm. Small-flowered Sweet-Briar. E. B. 2490, L. C. 349. Very similar to the last described, in stem, prickles, and leaves. Divisions of the calyx and segments longer and more leaf-like. Fruit *elliptical-ovate, without a neck*. Leaves sprinkled with rusty glands. Hedges. Shrub. June, July.

5. *R. rubiginosa*, Linn. Sweet-Briar. E. B. 991, L. C. 350. Shrub densely branched with straight shoots; prickles numerous, unequal, the larger curved. Leaflets five, hairy, glandular beneath and on the margin. Stipules broadly lanceolate. Divisions of the calyx elongated, persistent. Fruit obovate (pear-shaped), slightly bristly, crowned by the persistent calyx. Closely allied to the two preceding species. Shrub. June, July.

A. 16, C. 50. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

§ 3. *Villosa*. Shoots and prickles nearly straight; leaflets with diverging teeth; sepals persistent, converging; calyx-throat closed by a thick disk.

R. villosa, *R. tomentosa*, *R. hibernica*.

6. *R. villosa*, Linn. Hairy-leaved Rose. E. B. 583, L. C. 346. Stems stout, with slender, nearly straight prickles. Leaflets five-nine, rounded, with double, acute, nearly glandular serratures, downy on both sides. Tube of calyx furnished with glandular bristles. Fruit *large and globular, crowned with the leaf-like sepals*. Yorkshire, West Riding. Common. Fruit, September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—560 yards. T. 51°—41°.

Var. *Mollis*. E. B. 459. Fruit smaller. Sepals narrower and more pointed than in the type.

7. **R. tomentosa**, Sm. Downy-leaved Rose. E. B. 990, 1896, L. C. 347. Root-shoots erect or bending. Prickles nearly uniform, straight or curved. Leaves on short, bristly, glandular petioles; stipules pointed, spreading, glandular; leaflets about five, ovate, singly or doubly serrated, downy on both sides. Divisions of the calyx pinnatifid; segments elliptical-lanceolate, serrated. Fruit hispid, crowned with the spreading divisions of the calyx. Hedges. Shrub. June, July.

A var. of *R. villosa*? The leaves of both are doubly serrated, but in the latter they are more pubescent, or rather shaggy about the midrib. The sepals are simpler in the former than in the latter, in both they are glanduliferous. The petals are rather larger in *R. tomentosa*, and white; in *R. villosa* they are deep rosy-red. These are both common forms in Scotland, but especially the first described.

8. **R. hibernica**, Sm. Irish Rose. E. B. 2196, L. C. 342. Stem erect, bushy; prickles not numerous, unequal, slightly hooked; young shoots hairy, sometimes prickly, not glandular. Stipules broad, slightly serrated, glandulose. Leaflets roundish-ovate, simply serrated with deeply-cut, sharp teeth, slightly hairy below. Tube of the calyx round; divisions about as long as the petals, acuminate, pinnatifid, with spreading, linear, slightly glandular segments. Styles distinct. Fruit *roundish-ovate*, red or orange, sometimes round, *crowned with the upright segments of the calyx*. North of Ireland. Shrub. June—November. Hibernian.

SECT. II.—Carpels sessile or very shortly stipitate; stipes shorter than the carpel.

§ 1. *Pimpinellifoliae*. Shoots acicular (bristly); prickles straight or nearly straight; calyx-divisions persistent; disk thin or wanted.

R. Sabini, *R. involuta*, *R. Wilsoni*, *R. spinosissima*, *R. rubella*.

9. **R. Sabini**, Woods. Sabine's Rose. E. B. 2594, L. C. 345. Stem erect, with reddish-brown spreading branches; prickles numerous, unequal, straight, or nearly so. Peduncles with glandular setæ (stiff, glandular hairs). Leaflets five-seven, elliptical or ovate, rounded at both ends, rarely acute, never acuminate. Stipules rather broad, with sharp, spreading auricles, glandular and hairy. Flowers solitary or in threes. Calyx-tube ovate, segments about as long as the petals, hairy, bristly, glandular. Fruit *dark-red, globular*, or somewhat *urceolate*, crowned with the *erect persistent segments of the calyx*. North of England and Scotland. Shrub. June.

Var. *a. doniana*, Lind. E. B. 2601, L. C. 345 b. Prickles very numerous and very unequal. Leaves very hairy. Calyx-segments almost entire. Wood near Ingleton, Yorkshire.

Var. *β. gracilis*, Borr. L. C. 345 c. Large prickles more hooked, one of the segments of the calyx slightly toothed. Near Newcastle.

10. **R. involuta**, Sm. Prickly unexpanded Rose. E. B. 2068, L. C. 344. Dwarf shrub, spreading widely. Prickles and setæ

(bristles) straight, numerous, very unequal. Leaves on short, bristly petioles, with about seven leaflets; leaflets ovate, folded (plicate), doubly serrated; stipules pointed, ciliated. Peduncles and calyx bristly; calyx-tube ovate; divisions entire, spreading in flower. Fruit *ovate, bristly, crowned by the converging divisions of the calyx*. This Rose has some resemblance to *R. spinosissima*. West Highlands and Islands of Scotland. June, July.

10*. **R. Wilsoni**, Borr. Wilson's Rose. E. B. 2723, L. C. 343. Bush about three feet high, with slender, spreading branches and reddish foliage. Prickles very unequal, most of them slightly curved, the larger much dilated at the base, intermixed with setæ. Leaflets serrated, hairy, seven-nine; stipules with ovate, diverging points. Calyx-divisions simple, glandular. Fruit *ovate-roundish*, with a short neck, crowned with the persistent, *spreading* segments of the calyx. North Wales, Wilson. Shrub. June.

11. **R. spinosissima**, Linn. Burnet-leaved Rose. E. B. 187, L. C. 341. Stems erect, much branched at the summit, forming a low, tufted bush. Prickles very numerous, especially above, very unequal, slender, straight, more or less deflexed. Leaves with five-nine leaflets and uniform, nearly linear, stipules; stipules of the upper (floral) leaves somewhat broader, with spreading auricles; leaflets roundish or oblong-roundish, serrated. Divisions of the calyx lanceolate, acuminate, nearly half as long as the corolla, shaggy or downy within. Petals pure white, slightly yellow above the claw. Styles distinct, shorter than the stamens. Fruit nearly glabrous, globular, somewhat depressed, purplish-black when ripe. On sandy heaths. Perennial. Flower, June, July. Fruit, August, September.

A. 18, C. 60. Lat. 50°—60°. Alt. 0—650 yards. T. 52°—40°.

Var. *b. hispida*. Peduncles more or less hairy, almost prickly.

12. **R. rubella**, Woods. "Trans. Lin. Soc.," vol. xii., p. 177. Red Dog-rose. E. B. 2521. Stem two-three feet high, bushy; prickles straight, slender, *intermixed with glandular setæ* (bristles). Leaflets seven-eleven, broadly elliptical, blunt. Fruit small, *globular*, scarlet. Northumberland sea-coast (Mr. Winch). Shrub. July.

Area, etc., not given in "Cybele."

§ 2. *Cinnamomeæ*. Shoots with or without bristles (setæ); leaflets elongate, without glands; disk thin.

R. systyla, *R. arvensis*, *R. cinnamomea*, *R. Dicksoni*.

13. **R. systyla**, Woods. Close-styled Dog-rose. E. B. 1895, L. C. 352. In habit and usual habitat like *R. canina*. Prickles strongly hooked, with broad bases. Leaflets five-seven, serrated, not glandular, downy beneath. Calyx-divisions nearly simple, deciduous. Styles united, smooth. Fruit smooth, *elliptical, with a convex disk crowned by the united styles*. Hedges. Shrub. June.

A. ? C. ? Lat. 50°—58°. Alt. 0—100 yards. T. 50°—46°.

14. **R. arvensis**, Huds. Trailing Dog-rose. E. B. 188. Stems slender, low, except when supported; branches divaricate, long, arching, and sometimes rooting; prickles numerous, conical or com-

pressed, more or less curved. Leaves glabrous, with five-seven leaflets, whitish-green below; leaflets oblong or roundish, simply serrated, teeth large (sometimes doubly and unequally serrated); stipules uniform, slightly glandular, with lanceolate spreading auricles. Calyx-tube smooth; segments ovate, pointed, nearly entire. Styles united in a cylindrical column, about as long as the stamens. Fruit red when mature, roundish or oblong. Heaths and bushy places, &c. Shrub. June—September.

A. 14, C. 60. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

Var. *R. stylosa*. Leaves broader and hairier below. Segments of the calyx more acuminate.

15. **R. cinnamomea**, Linn. Cinnamon Rose. E. B. 2388, L. C. Excluded Species. Shrub, with brown, erect branches. Prickles strong, slightly curved. Shoots (suckers) densely prickly with setæ (bristles). Leaves five-seven leaflets; leaflets *lanceolate*, serrated, wrinkled, smooth above and downy beneath. Stipules broad, concave, somewhat fringed; petioles slender, unarmed. Flowers one-three; bracts large, reddish at the edges, concave; peduncles and calyx-tube quite unarmed. Divisions of the calyx entire, *narrow*, ciliated, spreading. Styles hairy, distinct. Fruit ovate or globular, crimson, crowned by the *converging sepals*.

Alien.

16. **R. Dicksoni**, Lind. Dickson's Rose. E. B. 2707, L. C. Excluded Species. Stems slender, with scattered, subulate, slender prickles. Leaflets large, with large, unequal teeth, slightly glandular. Divisions of the calyx entire, elongate, ciliated with setæ. Fruit *ovate-urceolate*, with a long tapering neck and a few glandular hairs. Ireland, Mr. Drummond. "Scarcely a native; it may prove to be a mere garden variety of *R. cinnamomea*, Hooker and Arnott." Hibernian.

TRIBE IV.—**Agrimoniæ**. Herbaceous plants or under-shrubs, with alternate, stipulate, compound or simple leaves. Calyx with a thickened disk-lined tube and a three- to five-lobed limb. Stamens definite (in *Agrimonia*, eight-twenty), inserted in the orifice of the calyx. Ovary solitary, with solitary or twin ovules. Fruit a nut (in *Agrimonia* one-two), enclosed in the tube of the indurated calyx.

Genera.—*Agrimonia*, *Sanguisorba*, *Poterium*, *Alchemilla*.

SYNOPSIS OF THE GENERA.

Agrimonia. Leaves interruptedly pinnate; stamens eight-twelve.

Sanguisorba. Leaves pinnate; flowers perfect, capitate; stamens few.

Poterium. Leaves pinnate; flowers diœcious, small; stamens thirty-forty.

Alchemilla. Leaves lobed, digitate, or palmate.

VIII. **Agrimonia**, Linn. Agrimony. Hairy herbaceous plants. Leaves interruptedly pinnate, rarely ternate. Leaflets

incised. Flowers spicate, yellow. Calyx five-cleft, with hooked bristles, constricted with a glandular ring. Petals five, notched, spreading. Stamens seven-twenty, inserted with the petals into the constricted part of the calyx. Ovaries two, sometimes three, with styles as long as the stamens; stigmas obtuse. Fruit usually two indehiscent carpels, one-seeded, enclosed in the indurated, turbinate calyx. Seed inverted.

1. **A. eupatoria**, Linn. Common Agrimony. E. B. 1335, L. C. 323. Roots thick, tufted. Stems erect, round, tapering, simple or branching above, hairy. Leaves interruptedly pinnate, with an odd leaflet. Leaflets ovate-oblong, deeply-toothed, intermediate and smaller leaflets entire or incised, all pubescent below; petioles and midribs furnished with longer reddish hairs. Stipules leaf-like, clasping, incised or toothed. Calyx usually with *one ripe carpel*. Waysides. Perennial. July.

A. 16, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

2. **A. odorata**, Thuil. Var. of the preceding (?). Stems taller than in *A. eupatoria*, and branching at the summit, leafy. Calyx of the fruit *globular, much larger than in the typical form*; this enlargement of the calyx is caused by the development of both carpels.

A. agrimonioides, Linn. *Aremonia agrimonioides*, D. C. "Fl. Gr." 458. Stem-leaves ternate; stamens eight (?); fruit smooth. This plant has recently been detected in the woods about Scone and in several parts of Perthshire. John Sim, in "Phytologist," N. S., vol. ii., p. 272. *places by hedges, Carrs of Gowrie & Adam Simpson 1851*

IX. **Sanguisorba**, Linn. Burnet. Herbaceous plants, with pinnate leaves, and cut or serrated leaflets, with densely spicate flowers. Perianth four-cleft, coloured, with four scales or bracts at the base, and constricted by an annular disk. Stamens four. Ovary with four angles. Fruit covered by the hardened calyx-tube, one-celled, indehiscent, one- or two-seeded.

S. officinalis, Linn. Common Burnet. E. B. 1312, L. C. 354. Root thick, woody. Stems erect, rigid, branching above, angular, smooth. Leaves pinnate, nine-fifteen leaflets; leaflets cordate, lanceolate serrate, shining above, glaucous below; stipules leaf-like, toothed. Flowers in dense ovate or obovate-cylindrical heads. Perianth dark purple; segments ovate, pointed, keeled. Moist upland pastures and meadows. Perennial. July.

A. 14, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 52°—47°.

X. **Poterium**, Linn. Salad-Burnet. Herbaceous or shrubby plants. Leaves pinnate, with cleft or serrated leaflets. Flowers in terminal heads or spikes, monœcious, the upper fertile, the lower barren. Calyx with three sepals. Corolla of the male flowers tubular, with a four-parted limb. Of the female flowers rotate, with a very short tube, constricted at the throat by an annular disk and four deep, reflexed, permanent segments. Stamens twenty-thirty, with long flaccid filaments and roundish two-lobed anthers. Ovaries

two or one, ovate-oblong in the calyx-tube. Style capillary. Stigmas tufted. Fruit an angular, rugged achenium, one- or two-celled, covered by the hardened urceolate calyx-tube, with oval, solitary seeds.

1. **P. Sanguisorba**, Linn. Common Salad-Burnet. E. B. 860, L. C. 355. Root somewhat woody. Stems erect, angular, hollow, furrowed, especially above, densely downy below, nearly glabrous above. Leaves compound, six-eight pairs of leaflets, with an odd one; the lower on long petioles, the upper sessile, all stipulate; stipules of the lower leaves membranous, attached by their whole length with linear herbaceous segments; those of the upper leaves broader, incised, or toothed. Leaflets oblong-obovate, mostly truncate at the top and truncate or cordate at the base, deeply toothed, glaucous-green below. Fruit *reticulated, wrinkled*, more or less downy, with four prominent angles. Calyx-lobes deciduous. Dry banks. Perennial. June, July.

A. 12, C. 40. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

2. **P. muricatum**, Spach. Warty-fruited Burnet. L. C. 355*. Stems erect. Leaflets oblong, incised, or deeply serrated, teeth long, sharp. Tube of the calyx indurated, quadrangular, angles winged, sides pitted, *elevated margins of the pits dentate*. Essex (Saffron-Walden); Warwickshire, near Leamington Station; Somersetshire. Perennial. June. (Compare "Phytologist," vol. iii., pp. 707-715.)

Area undetermined.

XI. **Alchemilla**, Linn. Lady's Mantle. Perennial, rarely annual plants. Stems procumbent. Leaves lobed or cleft or parted. Flowers axillary or terminal. Perianth eight-cleft, the four outer sepals alternate with, and smaller than, the inner ones, constricted with an annular disk. Stamens one-four, alternate with the larger, and opposite to the smaller sepals inserted into the ring. Style basilar, or nearly so. Fruit one-seldom two-seeded, invested by the persistent base of the perianth.

1. **A. vulgaris**, Linn. Common Lady's Mantle. E. B. 597, L. C. 356. Root somewhat woody. Stems slender, ascending or erect, round, hairy, branching at the top. Leaves hairy or downy, *reniform, plaited, lobed, roundish*, the root-leaves on long-stalks, the upper ones nearly sessile; lobes more or less deep, rounded, toothed, or serrated; teeth mucronate; lower stipules scarious, surrounding the stem; upper ones herbaceous, leaf-like, toothed or incised, spreading. Flowers in dense, terminal corymbs. Perianth (calyx) slightly hairy. Pastures. Perennial. June—September.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—1200 yards. T. 50°—35°.

Var. *β. subsericea*, Koch. Stem leaves and petioles silky.

2. **A. alpina**, Linn. Alpine Lady's Mantle. E. B. 244, L. C. 357. Root woody. Stems several, erect, downy, branching above. Radical leaves on long stalks, *five-seven-parted*; divisions obovate-oblong, obtuse, serrated at the end, beautifully silky-silvery below.

Lower stipules scarious, upper ones like the leaves. Calyx spreading, reflexed. Mountains. Perennial. June.

A. 6, C. 15. Lat. 54° — 60° . Alt. 150—1400 yards. T. 45° — 34° .

A. conjuncta, Babington, is distinguished from *A. alpina* by the lobes being connected for about one-third of their length; also by its large size and more silky appearance. Clova Mountains.—Mr. G. Don. Common in gardens, and flowers at the same time as the typical plant.

3. *A. arvensis*, Scop. Parsley Piert. E. B. 1011, L. C. 358. Root annual. Stems prostrate-ascending, producing lateral bundles (bunches) of flowers throughout nearly its whole length, hairy or downy. Root-leaves with a rounded or orbicular outline, *palmate*, with *cuneate lobes*, decayed before the plant flowers. Stem-leaves equal; stipules subulate, fleshy, united at the base, and closely embracing the bunch of flowers. Calyx downy, with erect-spreading teeth, which have a pearly white margin. In poor soils, sandy places and roadsides. Annual. May—August.

A. 18, C. 80. Lat. 50° — 60° . Alt. 0—150 (550) yards. T. 52° — 43° .

ORDER LXXXIX.—CRASSULACEÆ, D.C. THE HOUSE-LEEK FAMILY.

Succulent plants, either herbaceous or shrubby. Flowers cymose.

Sepals from three to twenty, more or less cohering at the base. Petals as many as the sepals, either distinct or cohering, inserted in the bottom of the calyx. Stamens inserted with the petals, and alternate with them, either of an equal number, or twice as many. Ovaries as many as the petals. Fruit follicular, opening by their ventral and sometimes by their dorsal suture, of five-, rarely three-twenty carpels, many- rarely two-seeded. Seeds minute, without albumen. Embryo cylindrical, minute, straight. Radicle towards the hilum.

SYNOPSIS OF THE GENERA.

Cotyledon. Corolla tubular, five-cleft. Carpels five.

Sedum. Petals five. Carpels five-six, many-seeded. (*Rhodiola* has four petals and four carpels.)

Sempervivum. Petals six-twenty. Carpels six-twenty.

Tilkea. Minute plants. Petals three-four; carpels three-four, two-seeded, constricted in the middle.



Fig. 188.—*Sempervivum tectorum*. 1, Flower-stem, much reduced; 4, a stamen with its anther; 6, a single carpel, magnified.

I. **Cotyledon**, Linn. Navelwort. Herbs or shrubs, with succulent leaves and spiked or paniced flowers. Calyx monosepalous, with a five-cleft limb and acute segments. Petals cohering, in a



Fig. 188.—*Sempervivum tectorum*. 2, single flower, natural size; 3, vertical section of the flower, showing the petals, stamens, styles, and interior of some of the ovaries; 5, ovaries, natural size.

tubular, campanulate, five-cleft corolla. Stamens ten, borne on the petals. Anthers roundish, two-lobed. Ovaries five, oblong, with a scale at the base, and each terminating in an awl-shaped style, with simple stigmas. Carpels five, each with one valve, and loculicidal dehiscence.

1. **C. umbilicus**, Huds. Linn. (?) Common Navelwort. E. B. 325, L. C. 418. Root roundish, flattened or concave, on which account probably the specific name was given. Stem erect, succulent, with a few leaves at the base, and then flowering all the way to the apex, ending in several undeveloped flowers, six-twelve inches high. Leaves on longish stalks, alternate, rounded peltate, concave, crenate, fleshy,

the upper ones more deeply crenate or lobed. Flowers numerous, pale yellow, in simple or compound clusters, pendulous, bracteate. Stamens short, in two rows. On rocks, banks, and old walls, in the south and west of England. Perennial. July.

A. 14, C. 40. Lat. 50°—57°. Alt. 0—300 yards. T. 52°—47°.

2. **C. lutea**, Huds. Greater Yellow Navelwort. E. B. 1522, L. C. p. 16. Stem a foot or more in height. Lower leaves somewhat peltate, upper ones obovate or ovate, crenate or toothed. Flowers numerous, large, erect, in simple or compound leafy spikes rather than clusters. Calyx divided almost to the base. Naturalized (?). Perennial. July.

This plant has been deemed British on very slight grounds. Hudson saw a plant in the garden of Mr. Clement, who received it from Somersetshire. A plant derived from this source (the garden of Mr. Clement) was long cultivated in the Chelsea garden, and from thence (a descendant of said plant) the figure in E. B. was drawn. (Compare Smith, Withering, and Hudson.)

II. **Sedum**, Linn. Stonecrop. Herbs, with scattered, succulent leaves, and generally cymose, corymbose, or spiked flowers. Calyx monosepalous, with a deeply parted limb and acute upright segments. Petals five, sometimes four, rarely six-eight, lanceolate, flat, spreading. Stamens ten-eight, rarely more, with roundish

anthers. Ovaries tapering into a short style. Stigmas blunt. Fruit consisting of five, sometimes four, rarely six-eight, spreading, many-seeded carpels, bursting along the inner margin, with a scale at the base of each.

SECT. I.—Flowers yellow, or white, or pink. Petals five, sometimes four, rarely six-eight.

1. **S. acre**, Linn. Biting Stonecrop. E. B. 839, L. C. 414. Barren-stems numerous, rooting at the base; flowering-stems with several leaves; barren stems very leafy. Leaves *ovate-triangular, more convex above than below*; those of the barren stems in six rows; concave at the base, where they are attached to and partly clasp the stems. Flowers in terminal branching corymbs. Sepals (divisions of the calyx) *very fleshy, leaf-like*. Petals oblong, lanceolate, more than twice as long as the calyx, greenish-yellow. Anthers yellow. Ovaries yellowish-green. On walls and dry sandy places. Perennial. June.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—250 yards. T. 52°—44°.

Note.—This species was observed on lofty rocks above Gordale, at a much higher altitude than that where *Bartsia alpina* grows, and the altitude of this latter is estimated, at 600—1000 yards, more or less. Is the upper limit of *S. acre* 500—600 yards?

2. **S. sexangulare**, Linn. Mild Stonecrop. E. B. 1946, L. C. 415. Stems prostrate, slender, round, leafy. Leaves *cylindrical, tapering, blunt, slightly spurred at the base*, arranged in six rows on the barren shoots. Flowers yellow, in a three-branched cyme. On dry rocks and walls; rare. Perennial. July.

Distinguished from *S. acre* chiefly by the foliage and slightly acid, not acrid, taste.

Alien. A. 6.

3. **S. anglicum**, Huds. English Stonecrop. E. B. 171, L. C. 412. Stems numerous, slender, two-four inches high, tufted, smooth, leafy. Leaves ovate, cylindrical, blunt, *smooth, fleshy, alternate, spurred at the base*. Flowers *white, with red spots*. Fruit membranous. On the sea-shore, and on lofty mountains and hilly places. The herbage of this species becomes red towards the end of summer. Annual. July, August.

A. 16, C. 40. Lat. 50°—61°. Alt. 0—1100 yards. T. 52°—38°.

SECT. II.—Leaves fleshy, tapering-cylindrical. Flowers white or rosy.

4. **S. album**, Linn. White Stonecrop. E. B. 1578, L. C. 413. Barren stems several, reclining, rooting at the base; flowering stems slender, *leafy*, purplish. Leaves cylindrical or obovate, turgid below, nearly flat above. Flowers white or rosy, in a forked corymb. Petals about *twice as long as the calyx*. Anthers brown. Ovaries green. Old walls. Perennial. June, July. *Rocks near Banhill, Perth*

Alien. A. 12.

Var. *β. turgidum*. Stems green, leaves larger, more ovate and turgid than in the common form of *S. album*. Of this variety we

have seen only cultivated examples. The common form grows wild on walls and roofs in the south and west of England. In France it grows on rocks and in dry stony fields.

5. *S. dasyphyllum*, Linn. Thick-leaved Stonecrop. E. B. 656, L. C. 411. Barren stems numerous, leafy, often rooting at the base; *flowering stems leafless, erect*. Leaves sessile, convex on the back, ovate, short, glabrous, glaucous. Flowers terminal in an irregularly branching corymb. Petals elliptical, blunt, three-four times as long as the calyx, with a reddish keel. Anthers very dark purple or nearly black. Ovaries the same colour as the inside of the flower. Carpels hairy or bristly, with long points. Old walls. Perennial. July.

Alien. *Intoxicis Craigie moor near Perth Johnson*

6. *S. villosum*, Linn. Woolly Stonecrop. E. B. 394, L. C. 410. Stems erect, solitary (barren shoots wanting), simple at the base, branching above, *hairy-glandular*. Leaves scattered, semi-cylindrical, linear-oblong, tapering at the base, blunt, *downy*. Flowers rosy-white, irregularly corymbose. Petals ovate-oblong, not awned, about twice as long as the calyx. On low rocks, on moory mountainous places. Sometimes with a perennial root, when it produces barren shoots. Biennial. July.

A. 7, C. 20. Lat. 54° — 58° . Alt. 0—700 yards. T. 46° — 40° .

Note.—Perennial, according to Smith; biennial, Koch; annual, De Candolle. "Discrepant doctores; qu's judicabit?"

7. *S. reflexum*, Linn. Crooked Yellow Stonecrop. E. B. 695, L. C. 416. Stems stout, reclining, then erect, densely leafy, with barren shoots at their base. Leaves thick, tapering to a bristly point. Flowers yellow, in a dense, terminal cyme. Segments of the calyx ovate, about half the length of the petals. Petals lanceolate, obtuse. On cottage roofs. Perennial. July.

A. 11, C. 30. Lat. 50° — 56° . Alt. 0—200 yards. T. 51° — 48° .

Var. *S. glaucum*, not *S. glaucum* of continental botanists. Whole plant slenderer, and of a more glaucous hue.

8. *S. rupestre*, Linn. Rock Stonecrop. E. B. 170, L. C. 416*. Stems prostrate, round, smooth, reddish, very leafy. Leaves subulate, spurred at the base, slightly flattened above. Calyx glaucous, with a reddish tinge. Petals bright yellow. Little St. Vincent's Rocks, between Bath and Bristol. Perennial. July.

A. 6, C. 10. Lat. 50° — 55° . Alt. 0—400 yards. T. 52° — 45° .

9. *S. Forsterianum*, Sm. Welsh Rock Stonecrop. E. B. 1802, L. C. 416*. Barren stems very short and leafy. Leaves subulate, spurred at the base, in dense rose-like tufts. Distinguished from the foregoing, Smith says, by the bright green colour of its foliage, and by the rosettes of spreading leaves. Nant Francon, Carnarvonshire. Perennial. July.

Are Nos. 7, 8, 9 varieties of one species?

SECT. III.—Leaves flat; flowers yellow (?) in *S. Rhodiola*, purple in *S. Telephium*.

10. *S. Telephium*, Linn. Orpine, Everlasting. E. B. 1319,

L. C. 409. Roots thick, creeping, with fleshy fibres. Stems usually several, erect, simple below, branching above, round, smooth, leafy. Leaves oblong or obovate, flat (not convex), fleshy; the lower narrowed at the base, the upper sessile, laxly toothed, glabrous and glaucous. Flowers *rose-purple*, paler without, in terminal *dense corymbs*. Petals lanceolate, acute, spreading, recurved at the apex, united below with the inner row of stamens. Hedges, banks, riversides. Perennial. July, August.

A. 17, C. 70. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

Var. *S. purpureum* (?). Flowers deep red. Yorkshire and North Wales. Is this *S. purpureum*, Tausch?

11. **S. Rhodiola**, D. C. Rose-root. E. B. 508, L. C. 408. Root thick, smelling when dry like Roses. Stems several, round, tapering, erect, leafy. Leaves scattered, obovate or oblong, pointed, toothed or serrated, glaucous. Flowers in a compact cyme, *diœcious*. Sepals and petals four, the former erect, the latter reflexed. Stamens six-eight, much longer than the petals; anthers bluish. On wet alpine rocks. Perennial. June.

A. 10, C. 25. Lat. 52°—61. Alt. 0—1300 yards. T. 48°—34°.

There is a whimsical account of this flower in "*Florâ Lapponicâ*," Smith's edition, p. 315:—"Curiosa est hic sexûs consideratio. Matrimonia in alterâ plantâ constant appropriatis maritis et uxoribus, thalamo impositis splendido, aulæo luteo et quinque partito, sed steriles sunt hæ Saræ. In alterâ autem plantâ, matrimonia, thalamos nudos aulæis destitutos exhibent, atque in iisdem feminas quinque maritis orbatas deprehendis. Hæ Hagares concipiunt e maritis legitimarum et sterilium uxorum, familiam propagant."

III. **Sempervivum**, Linn. House-leek. Herbs or shrubs, with very succulent entire leaves, disposed in rosettes. Stem-leaves scattered. Calyx monosepalous, limb deeply divided into from six to twelve uniform, fleshy segments. Petals as many as the segments of the calyx, lanceolate, acute, withering. Stamens as many or twice as many as the petals. Carpels as many as the stamens, radiating and terminating in a point. Seeds numerous.

S. tectorum, Linn. E. B. 1320, L. C. 417. Flowers in unilateral spikes, sessile. Sepals and petals lanceolate, hairy. Carpels hairy, terminated by the hairy styles. Cottage-roofs. Perennial. July. Alien.

This plant, which has only recently been deemed an alien, grows on such places as produce *Sedum reflexum*. It appears on walls and cottage-roofs from the Pyrenees and the Alps to the middle of Norway, Sweden, and Russia.

IV. **Tillæa**, Linn. Tillæa. Small annual plants, with filiform, very slender stems and opposite connate, concave leaves. Flowers small, axillary, solitary, sessile. Calyx often coloured in three-four divisions (three-four coherent sepals). Petals three-four, white. Stamens as many as the petals. Scales *wanting* or *very small*.

Carpels three-four, two-seeded, constricted in the middle (between the two seeds).

T. muscosa, Linn. Moss-like Tillæa. E. B. 116, L. C. 407. Stems one-three inches high, spreading or ascending, often contiguous and tufted (growing in a tuft), simple or branched, glabrous, sometimes rooting at the base. Leaves very small, ovate, acute, mucronate, glabrous, often reddish, connate at the base. Flowers sessile. Sepals ovate or lanceolate, acute. Petals narrow, subulate, white, tipped with red. On sandy open heaths in the east of England (Norfolk and Suffolk). Annual. June—August.

A. 1, C. 2. Lat. 52° — 53° . Alt. 0—50 yards. T. 49° — 48° .

ORDER XC.—**ILLECEBRACEÆ**, Br. THE KNOT-GRASS FAMILY.

Annual or biennial, herbaceous or half-shrubby plants, with opposite or scattered, entire sessile leaves, and scarious stipules. Sepals usually five, rarely three or four. Petals minute or wanting. Stamens generally equal in number to the sepals, sometimes fewer by abortion. Ovary one- rarely three-celled, with one or more ovules. Styles two-five, distinct or coherent. Fruit a utricle or three-valved capsule; in either case covered by the calyx. Albumen farinaceous; embryo annular, curved round the albumen. Radicle towards the hilum.



Fig. 189.—*Scleranthus annuus*. 1, A branch with leaves and flowers, reduced; 2, a flower-bud unexpanded; 3, flower expanded; 4, section, showing the ovary and style; 5, fruit with persistent calyx; 6, section of seed, showing the albumen surrounded by the curved embryo.

SYNOPSIS OF THE GENERA.

Corrigiola. Flowers small, white or tinged with rose-colour, in many-flowered terminal clusters, surrounded by floral leaves.

Herniaria. Flowers herbaceous (green), in lateral many-flowered clusters, intermixed with leaves.

Illecebrum. Flowers milk-white, in axillary clusters (three-five false verticels).

Polycarpon. Flowers small, in forked terminal cymes.

Scleranthus. Leaves opposite, connate, linear, subulate. Flowers green or whitish, in forked cymes.

I. Corrigiola, Linn. Strapwort. Stems numerous, prostrate. Leaves scattered, entire, slightly fleshy; stipules small, scarious.

Flowers small, in terminal clusters, surrounded by the floral leaves. Calyx five-parted, with *concave divisions*. Petals five, persistent, oblong, slightly surpassing (longer than) the calyx. Stamens five. Stigmas three, very short, nearly sessile. Capsule crustaceous, ovate-triangular, one-seeded, not opening, enveloped in the persistent calyx.

C. littoralis, Linn. Sand Strapwort. E. B. 668, L. C. 396. Stems numerous, spreading, prostrate, filiform below, enlarged and flattened above. Leaves scattered, linear-oblong, or oblong, narrowed at the base, blunt. Flowers in clusters at the top of the stem and branches. Divisions of the calyx often coloured, scarious and white at the margins. Petals pure white. South coasts of England. Annual. July, August.

A. 1, C. 2. Lat. 50°—51°. Alt.? T. 52°.

II. Herniaria, Linn. Rupturewort. Annual or biennial plants, with prostrate stems. Leaves opposite or alternate above, quite entire; stipules small, scarious. Flowers small, herbaceous, in lateral clusters. Calyx five-parted, *divisions scarcely concave*. Petals five. Stamens five, inserted on a fleshy disk, which invests the throat of the calyx. Stigmas two, very short, free or united below. Capsule membranous, oblong, one-seeded, not opening, enveloped in the persistent calyx.

1. **H. glabra**, Linn. Smooth-leaved Rupturewort. E. B. 206, L. C. 397. Stems very numerous, slender, cylindrical, much branched, prostrate, rooting, leafy, and bearing flowers from the base. Leaves *glabrous*, ovate or oblong, quite entire, sessile. Flowers in dense clusters, sessile. Calyx *glabrous*. Sepals concave, greenish, more or less hooded. In gravelly or sandy ground. Shores of Cornwall, Suffolk, Lincoln, Ireland. Biennial or perennial(?). July, August.

A. 4, C. 8. Lat. 50°—54°. Alt. 0—100 yards. T. 52°—48°.

2. **H. ciliata**, Bab. Fringed Rupturewort. E. B. 2857, L. C. 397 b. Stems prostrate, spreading, with minute, decurved (reflexed?) hairs. Leaves obovate or roundish, tapering at the base, fringed the whole extent of their margin. Flowers in small clusters of about four or five in each. Clusters solitary or two or three together in the axils of the leaves of the lateral branches. Sepals fringed. Lizard Point, Cornwall, on gravelly soils, walls, and banks. Perennial(?). July—September.

Range?

This plant, whether it be a variety or a species, approaches nearer to *H. hirsuta* than *H. glabra*, both in the shape of its leaves and in the laxer clusters and fewer flowers.

H. hirsuta, Linn. Hairy Rupturewort. E. B. 1379, L. C. Excluded Species, p. 16. Stems as in *H. glabra*, but hairy, more elongate, with fewer flowers and fewer leaves. Leaves oblong or ovate-oblong (much longer than in *H. glabra*), pubescent, and strongly ciliated (fringed) on the margin. Calyx *hairy*, with long fringes. Clusters of flowers smaller and less numerous than in *H. glabra*.

Sandy fields; a very doubtful native of Great Britain. Annual or perennial (?). June—September.

III. **Illecebrum**, Linn. Knot-grass. Gristlewort, Ger. Stems prostrate, often rooting. Leaves opposite, entire, with very small stipules. Flowers small, milk-white, in axillary clusters. Calyx five-parted, with thick spongy divisions, *concave hooded, with a subulate point*. Petals five, filiform, very short. Stamens five, with very short filaments. Stigmas two, short, sessile, united below. Capsule membranous, oblong, one-seeded, furrowed, bursting along the furrows, enveloped in the persistent calyx.

I. verticillatum, Linn. Whorled Knot-grass. E. B. 895, L. C. 395. Stems filiform, procumbent, spreading, reddish, leafy. Leaves roundish or ovate, small, about as long as the clusters of flowers. Flowers white, axillary, whorled. Boggy places in Devon. Annual. July.

A. 1, C. 2. Lat. 50° — 51° . Alt. 0. T. 52° — 50° .

IV. **Polycarpon**, Linn. All-seed. Leaves obovate-oblong, the lower in whorls, with scarious stipules. Sepals five, slightly united at the base. Petals five, entire or notched, shorter than the sepals. Stamens five, or fewer by abortion. Styles three, very short. Capsule opening to the base by three valves.

P. tetraphyllum, Linn. Four-leaved All-seed. E. B. 1031, L. C. 398. Stems slender, forked or branched, often in a tuft. Leaves smooth, obovate-oblong, the lower in verticels of four, the upper opposite. Flowers in forked cymes, the branches of which are subtended by scarious bracts. Sepals mucronate, with scarious margins. Coasts of Devon, &c. Annual. May—July.

A. 3, C. 4. Lat. 50° — 52° . Alt. ? T. 52° — 50° .

“Naturalized at St. Cloud and at Malesherbes.”—Coss. and Ger.

V. **Scleranthus**, Linn. Knawel. Rigid weeds, with opposite, linear, often combined (coherent) leaves. Flowers axillary and terminal, aggregate. Perianth single, urceolate, ribbed at the base, with a limb parted into five deep segments. Stamens five-ten. Ovary roundish, with spreading styles and simple downy stigmas. Fruit utricular, membranous, inclosed in the indurated tube of the perianth. Seeds two, convex on one side and flat on the other (Smith); often one by abortion.

1. **S. annuus**, Linn. Annual Knawel. E. B. 351, L. C. 399. Stems more or less reclining or prostrate, very much branched, bushy, slender, enlarged at the junctions, downy, forked, especially above. Leaves linear, subulate, connate at the base. Divisions of the calyx *linear lanceolate, as long as the tube, pointed, with a narrow scarious margin, spreading when in flower, erect or slightly divergent in fruit*. Sandy fields. Annual. July.

A. 17, C. 80. Lat. 50° — 58° . Alt. 0—350 yards. T. 52° — 44° .

2. **S. perennis**, Linn. Perennial Knawel. E. B. 352, L. C.

400. Stems branched, more rigid than in the preceding species, branches shorter, more spreading, not so leafy, slightly downy. Leaves with a ciliated, scarious margin at the base, subulate, *short*. Divisions of the calyx *ovate or ovate-lanceolate, with an obtuse point, and broad scarious margin*, nearly connivent when in fruit. Sandy fields. Biennial (?). July.

A. 2, C. 4. Lat. 51°—53°. Alt. ? T. 51°—48°.

ORDER XCI.—**PORTULACÆ**, Juss. THE WATER PURSLANE FAMILY.

More or less succulent plants, with forked stems, opposite leaves, and lateral and terminal solitary or aggregate flowers. Sepals two, rarely three-five, either free or united at the base. Petals five, rarely four-six, inserted at the base of the calyx, more or less united, rarely free. Stamens three-twelve, inserted at the base of the calyx. Ovary free, or united with the calyx, one-celled by disruption of the partitions. Ovules on a central placenta. Fruit capsular, membranous, one-celled, many seeded, opening by a lid (dehiscence circular), (pixed) or three-seeded and three-valved, with valvular opening. Albumen central. Embryo annular, curved round the albumen. Radicle contiguous to the hilum.

I. Montia, Linn. Blinks. Small annual plants, with forked stems, and opposite, entire, rather succulent leaves and terminal flowers. Calyx with two persistent sepals. Corolla with five petals, cohering at the base, unequal, the three smaller bearing the stamens. Stamens three, rarely four-five. Ovary turbinate, three-lobed, with three downy stigmas. Fruit capsular, one-celled, three-valved, three-seeded. Seeds on a central column.

M. fontana, Linn. Water Blinks. E. B. 1206, L. C. 394. Stems one-four inches high, reclining, ascending, or erect, often tufted, glabrous, fleshy. Leaves opposite, oblong or spathulate, attenuated into a petiole, quite smooth. Flowers very minute, white, bending downwards on the pedicel. Fruit capsular, erect when at maturity. Wet places. Annual. May.

A. 18, C. 82. Lat. 50°—60°. Alt. 0—1100 yards. T. 52°—36°. Sub-var. *elongata*. Stems slender, elongated, prostrate, or swimming.

Claytonia, Linn. Succulent annual plants. Calyx with two sepals. Petals five. Capsule three-valved, one-celled, three-seeded.

C. perfoliata, Don. American Salad. Root-leaves spathulate, rhomboid; stem-leaves orbicular, angular, perfoliate. Naturalized about Ampthill, Bedfordshire, and in Surrey.—H. C. Watson. Near Christchurch, Hants.—Mr. Hussey. "Phytologist," N.S., vol. i., p. 389.

C. alsinoides (24)

ORDER XCII.—**LYTHRACÆ**, Juss. THE LOOSESTRIFE FAMILY.

Herbaceous, rarely shrubby plants. Leaves entire, exstipulate,

mostly opposite. Calyx monosepalous and tubular, variously lobed. Petals deciduous, inserted between the calycine segments. Stamens inserted into the tube of the calyx, under the petals, variable in number, but mostly some multiple of the petals. Ovary two- or four-celled. Fruit capsular, membranous, one-celled, covered by the calyx. Seeds numerous, small. Embryo straight. Radicle towards the hilum.

SYNOPSIS OF THE GENERA.

Lythrum. Stems erect; calyx tubular, cylindrical; petals longer than the calyx.

Peplis. Stems creeping; calyx campanulate; petals very small, or absent.

I. **Lythrum**, Linn. Purple Loosestrife or Willow-herb. Herbs or half-shrubby plants. Leaves simple, entire, oblong. Flowers axillary, sessile, or nearly so. Calyx cylindrical, with four-six large, and as many intermediate small teeth. Petals half as many as the calyx-teeth, elliptic-oblong, inserted by short claws into the rim of the calyx. Stamens two or three times as many as the petals, alternately long and short, with roundish incumbent anthers. Ovary ovate-oblong, with a filiform style and capitate stigma. Fruit two-celled, many-seeded, enclosed in the persistent calyx.

1. **L. Salicaria**, Linn. Purple Willow-herb. E. B. 1061, L. C. 390. Roots woody. Stems somewhat woody at the base, *angular*, with winged angles, simple or branching. Leaves lanceolate, *cordate at the base*, clasping opposite, seldom in whorls of three leaves, glabrous or downy. Flowers axillary, on short pedicels, forming long, leafy, spike-like terminal clusters. Calyx hairy, outer teeth long, diverging, setaceous, hairy, inner teeth triangular, converging, closing the mouth of the calyx. Petals deep rose-colour, lanceolate-toothed, tapering below. Banks of rivers and ponds. Perennial. July, August.

A. 16, C. 60. Lat. 50° — 57° . Alt. 0—200 yards. T. 52° — 46° .

2. **L. hyssopifolia**, Linn. Grasspoly. E. B. 292, L. C. 389. Root fibrous, *annual*. Stem ten-eighteen inches high (often less when the plant grows in a poor, dry, gravelly soil), erect, *round*, smooth, branched or simple, leafy. Leaves *oblong-linear*, attenuated at the base, sessile, alternate, glabrous. Flowers axillary and solitary, sessile, calyx glabrous, cylindrical-campanulate, with six outer spreading subulate teeth and as many inner triangular ones, which are erect and barely half the length of the outer row. Calyx of the fruit erect. In moist, sandy, or gravelly places. Wandsworth steam boat pier. In 1853 only a single plant was noticed in this station; in 1855 there were hundreds.—A. I.

A. 6, C. 12. Lat. 50° — 54° . Alt. 0—100 yards. T. 50° — 48° .

XI. **Peplis**, Linn. Purslane. Stem prostrate, rooting, square, with small, opposite, entire leaves. Flowers solitary, axillary, small. Calyx bell-shaped, short, limb twelve-parted; segments in two rows, the inner row longer and broader, erect, the outer row alternate and

spreading. Petals six, minute, caducous, or wanting, inserted on the summit of the calyx tube, and alternate with its inner segments. Stamens six, inserted with the petals. Stigma nearly sessile, capitate. Capsule roundish, two-celled, many-seeded, thin, membranous, bursting irregularly, its lower half surrounded by the persistent calyx.

P. Portula, Linn. Water Purslane. E. B. 1211, L. C. 391. Stems numerous, prostrate, rooting, simple or branched, flowering from the base, smooth, red, leafy. Leaves obovate or spatulate, opposite, tapering into the petioles, often reddish. Flowers sessile, axillary, inconspicuous. Calyx reddish, with triangular pointed lobes and two long setaceous teeth at their base. Corolla pale rose, often wanting. Fruit round, reddish, partly covered by the persistent calyx. Watery places. Annual. Perennial (?). July, August. A. 18, C. 80. Lat. 50°—60°. Alt. 0—300 yards. T. 52°—43°.

ORDER XCIII.—**LEGUMINIFERÆ**, Juss. THE PEA AND BEAN FAMILY.

Herbaceous plants, shrubs or trees. Leaves alternate, compound, or simple by abortion, stipulate. Stipules persistent or deciduous, rarely absent. Flowers in erect or pendulous clusters, in heads or in



Fig. 190.—*Astragalus glycyphyllos*. 1, Two flowers entire; 2, standard enlarged; 3, the stamens and part of the calyx; 4, pistil; 5, keel (carina); 6, wings; 7, legume; 8, transverse section of legume; 9, section of the seed.

umbels, rarely in panicles, with or without bracts. Calyx tubular, five-, rarely four-parted (by the complete union of two of the sepals),

usually persistent. Corolla irregular (papilionaceous), or regular, or absent. Petals five, inserted at the base of the calyx, free, rarely united, and forming a gamopetalous corolla. Upper petal (standard) folded lengthways during prefloration, and embracing the lateral petals (wings, alæ); the lateral petals applied to the lower petals; the lower contiguous and united, so as to form the carina (keel). Stamens ten, inserted at the base of the calyx, with the filaments united, and forming an entire or cleft tube (monadelphous), or one stamen is free and the other united (diadelphous). Ovary free, of one carpel. Ovules inserted at the inner angle. Stigma terminal or nearly lateral. Fruit (legume) dry, many- or few-seeded, opening at the ventral and dorsal nerve, sometimes with transverse partitions, and not opening. Seed with a large hilum. Albumen absent. Embryo usually curved. Radicle approaching the hilum, usually folded upon the edges of the cotyledons.

TRIBE I.—Loteæ. Leaves unequally pinnate or trifoliolate, rarely simple by abortion. Legume (fruit) usually one-celled; rarely two-celled by the inflexion of the dorsal nerve, sometimes twisted. Stamens monadelphous or diadelphous. Cotyledons germinating above ground.

SUB-TRIBE I.—Genisteæ. Stamens monadelphous.

Genera.—*Sarothamnus*, *Genista*, *Ulex*, *Ononis*, *Anthyllis*.

SYNOPSIS OF THE GENERA.

Sarothamnus. Shrubs without spines. Leaves ternate. Style much elongated, filiform, spirally twisted during flowering. Pod (legume) flat, many-seeded.

Genista. In this and in the next following genus, the leaves are simple by abortion. Small shrubs, rarely spinous. Stigma oblique.

Ulex. Shrubs, with spinous abortive branches. Calyx two-lipped, divided to the base.

Ononis. Perennial, sometimes half-shrubby plants. Calyx in five linear divisions.

Anthyllis. Leaves pinnate. Calyx tubular, inflated. Legume one-two-seeded.

I. *Sarothamnus*, Wimm. Broom. Shrubs, with erect, round, or angular branches, without spines. Leaves simple and trifoliolate, *without stipules*. Flowers solitary and axillary. Calyx short, two-lipped, toothed, and scarious at the margin. Standard nearly round, cordate at the base. Stamens all united. Style long, inflexed. Legume oblong, compressed, many-seeded. Seeds deciduous, on a two-lobed caruncle.

1. *S. scoparius*, Wimm. *Spartium scoparium*, Linn. Common Broom. E. B. 1339, L. C. 248. Under shrub very much branched; branches erect, angular, furrowed. Leaves trifoliolate or simple;

leaflets or leaves oblong-obovate, pubescent or silky on both sides, the upper ones sessile. Flowers large, in terminal clusters. Fruit with hairy borders. Commons, woods, heaths. Perennial. May.

A. 17, C. 80. Lat. 50°—59°. Alt. 0—650 yards. T. 51°—41°

II. Genista, Linn. Petty Whin, Green-weed. Shrubs of humble growth, sometimes thorny. Leaves *simple*, entire. Flowers axillary and solitary. Calyx tubular, two-lipped, upper lip in two deep segments, lower one three-toothed. Standard oblong, distant; wings spreading; keel with two lanceolate petals, slightly cohering. Filaments more or less monadelphous; the odd one separated more than half-way down. Legume turgid, somewhat compressed, obliquely pointed, with numerous, rarely with few, seeds. Seeds roundish.

1. **G. pilosa**, Linn. Hairy Woad, or Dyer's Weed. E. B. 208, L. C. 252. Stems procumbent, winged, or angular, furrowed, *not prickly*, leafy and branching, woody. Leaflets elliptic-lanceolate, slightly *hairy or silky*, channelled at the midrib, slightly plicate; stipules narrow, blunt. Flowers yellow, in lax clusters. Calyx cylindrical, silky, with long linear teeth. Legume compressed, *hairy*. A very local species. Dry, sandy, and gravelly places. Perennial. July.

A. 4, C. 4. Lat. 50°—53°. Alt. 0—100 yards. T. 52°—49°.

2. **G. tinctoria**, Linn. Woad-waxen, Dyer's Green-weed. E. B. 44, L. C. 251. Shrubby plants. Stems ascending or erect, simple or branching, *partly herbaceous*, roundish, with prominent angles and deep furrows, glabrous. Leaves oblong, pointed, or blunt, smooth, shining. Flowers in terminal, *rather close, clusters*. Pedicels short, axillary. Standard smooth. Fruit *glabrous*, compressed. Perennial. June, July.

A. 14, C. 50. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—47°.

3. **G. anglica**, Linn. Petty Whin. E. B. 132, L. C. 253. Low much branched shrub, spreading, the *lateral branches terminating in slender spines*. Leaves oblong-elliptic, pointed. Flowers axillary, in lax clusters. Legume linear, inflated, glabrous. Heaths and commons. Perennial. May.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—700 yards. T. 52°—40°.

III. Ulex, Linn. Furze, Whin, Gorse. Ligneous, bushy plants. The numerous compound striated thorns with which the plant is beset appear to be metamorphosed leaves. Calyx coloured, divided to the base, the upper division with two, the lower with three teeth. Standard of corolla ovate, cleft, somewhat longer than the calyx; wings obtuse. Keel with two straight, obtuse, cohering petals. Stamens all united at the base, one slightly separate. Legume oblong, turgid, few-seeded, about as long as the calyx. Valves rigid, elastic. Seeds with a tumid crest.

1. **U. europæus**, Linn. Gorse, Whin. E. B. 742, L. C. 249. Branches spreading, lateral ones almost equal, ending in a spine. Pedicels, bracts, and calyx very hairy. Bracts larger than the pedicel.

Fruit (legume) downy, hairy. Heath and commons. Perennial. Flowers in April, and again in Autumn.

A. 17, C. 80. Lat. 50° — 59° . Alt. 0—700 yards. T. 52° — 42° .

U. strictus, Mack. Erect-branched Furze. L. C. 249 b. Stem much humbler than in the foregoing, with erect branches and *small slender spines*. Flowers (rarely produced) on the summit of the stem and branches, slightly different from those of the preceding. In Lord Londonderry's Park, Down, Ireland. Shrub. Perennial. April, May.

2. *U. nanus*, Forst. Dwarf Furze. E. B. 743, L. C. 250. Bushy, low, spreading shrub. Stems much branched; branches mostly on one side, nearly equal; secondary branches very short, terminating in long, deflexed, curved, slender spines. Bracts very small, narrower than the diameter of the pedicel. Calyx downy, with appressed pubescence, and *with more distinct and spreading teeth than U. europæus*. In this species or variety the flowers are smaller than in No. 1. It flowers in autumn; the Common Furze in the spring. On open heaths. Shrub. Perennial. August—November.

A. 12, C. 40. Lat. 50° — 55° . Alt. 0—200 yards. T. 52° — 48° .

U. Gallii, var. of *U. nanus*, or of *U. europæus* (?). "*U. nanus* and *U. Gallii* have frequently flowers near the ends of the branches, but their usual position is near the base of the primary spines, and never, as in *U. europæus*, scattered more than half along their length, or on the secondary spines."—Jas. Woods, F.L.S., in "*Phytologist*," vol. iii., p. 1059.

In *U. Gallii* the wings are supposed to be one-thirtieth or one-fortieth of an inch larger than the keel. In *U. nanus* the wings and keel are said to be equal. A fine distinction!

IV. *Ononis*, Linn. Rest-harrow. Herbaceous plants or shrubs, occasionally spinous. Leaves ternate, toothed. Stipules large, and often adnate. Flowers stalked. Calyx tubular, with five linear segments. Standard large, striated, keeled and compressed at the back; wings obovate; keel a little longer than the wings, pointed. Stamens all united. Style long. Legume turgid, sessile. Valves elastic and rigid. Seeds few, kidney-shaped.

1. *O. arvensis*, Linn. (?), Roth. (?) Rest-harrow or Cammock. E. B. 2659, L. C. 254. Stems round, tapering, *more or less hairy*, rooting at the base (?), ascending, much branched and leafy (the branches sometimes terminate in a spine). Leaves elliptical, oblong, or cuneate, sharply and uniformly toothed at the upper end, tapering and less toothed below, with long spreading glandular hairs; stipules united for the greater part of their length, the free part triangular and pointed. Flowers axillary and solitary, *on short pedicels*. Divisions of the calyx linear-lanceolate. Legume hairy, *not so long as the divisions of the calyx*. Seeds finely tubercular. Roadsides, commons, and pastures. Perennial. June—September.

A. 17, C. 75. Lat. 50° — 59° . Alt. 0—200 yards. T. 51° — 46° .

Var. *a. arvensis*, Grenier; *O. procurrens*, Wallr.; *O. spinosa*, Linn. Fl. Suec. Fl. Dan. v., 783. "Stems eighteen-twentyfour inches high; leaves and flowers large, the latter in lax spikes; floral leaves as long as the calyx. *O. arvensis*, Lam."

Var. *β. maritima*, Gr.; *O. repens*, Linn. Stems slender, four-five inches high; flowers small, in short, dense spikes; floral leaves (bracts) shorter than the calyx.

2. ***O. antiquorum***, Benth. (not Linn.); *O. campestris*, Koch. Thorny Rest-harrow. Baxter, vol. iv., p. 289. E. B. 682, L. C. 255. Stems and branches woody, erect, or nearly so, round, olive-coloured, with woolly or hairy alternate lines; spines stout, two-three together, spreading. Leaves linear-oblong, laxly toothed, glandular. Flowers large, solitary and axillary, on pedicels, which are much longer than those of *O. arvensis*, but not so long as the calyx. Divisions of the calyx linear-lanceolate, glandular, not hairy. Corolla twice as long as the calyx. Legume ovate, compressed, as long as the calyx. Seeds ovate, brown, tubercular, two-four. Barren places, roadsides, pastures. Perennial. June—September.

A. 16, C. 60. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

Grenier states that *O. antiquorum*, of Linnæus, is distinguished from the above, or *O. campestris*, Koch, by more slender and flexuous stems, which have not the hairy alternate lines of *O. antiquorum*, Benth., by the much smaller leaves and flowers, by its legume equaling the calyx, and by its solitary, finely tubercled seed.

3. ***O. reclinata***, Linn. Prostrate Rest-harrow. E. B. 2838, L. C. 256. Stems slender, round, hairy, branched, spreading, diffuse; branches not terminating in spines (secondary branches not changed to spines?). Leaves cuneate, strongly nerved and toothed only in their upper half, on slender petioles. Flowers in terminal, leafy clusters, on long slender pedicels (the latter as long as the leaves). Divisions of the calyx linear-lanceolate, twice as long as the tube. Corolla not longer than the calyx. Legume cylindrical, hairy, dark brown when ripe, longer than the calyx. Seeds numerous, compressed, tubercled. Sandy places. Galloway, Channel Isles. Annual. June (?).

A. 1, C. 1. Lat. 56° (?). Alt. ? T. ?

V. ***Anthyllis***, Linn. Lady's Finger. Stems herbaceous. Root-leaves entire; stem-leaves pinnate, thick. Flowers yellow or reddish, in a dense round head. Calyx coloured, with an inflated tube; upper-lip two-toothed, lower three-cleft, bladder-like when in fruit; teeth connivent. Standard rather larger than the wings; wings and keel adhering together by the limb. Stamens all united. Style curved-ascending. Stigma terminal. Fruit compressed, roundish, one- or two-seeded, enclosed in the calyx-tube.

A. vulneraria, Linn. Common Lady's Finger. E. B. 104, L. C. 257. Stems erect, ascending, or spreading, sometimes branching, more or less downy or hairy. Lower leaves oblong entire; upper pinnate, oblong or linear, with a large terminal lobe (the lateral lobes

are sometimes abortive, and then the leaf is simple). Flowers yellow, rarely red. Calyx-teeth triangular-lanceolate, very hairy. Corolla longer than the calyx. Chalky and dry gravelly places. Perennial. June.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—800 yards. T. 52°—38°.

Var. *β. Dillenii*. Whole plant smaller, with red flowers.

SUB-TRIBE II.—**Trifolieæ**. Stamens diadelphous.

Note.—Nine of the stamens are connected by a membrane, and one is free.

Genera.—*Lotus*, *Medicago*, *Melilotus*, *Trifolium*, *Astragalus*, *Oxytropis*.

SYNOPSIS OF THE GENERA.

Lotus. Perennial or annual herbaceous plants, with trifoliate leaves. Legume *linear, straight, cylindrical, many-seeded*.

Medicago. Annual or perennial plants. Legume *reniform* (broadly heart-shaped), or *falciform* (like a sickle), or *spirally twisted*.

Melilotus. Biennials, with a thick vertical root. Leaves pinnate-trifoliate. Flowers in spike-like clusters. Legume *longer than the calyx, straight, oblong, one-four-seeded*.

Trifolium. Annual or perennial plants. Leaves trifoliate. Flowers in heads (capitules), or in short, dense, compact spikes. Legume small, usually enclosed in the calyx.

Astragalus. Perennial plants, with unequally pinnate leaves. Flowers in axillary clusters. Legume many-seeded, elongated, curved, incompletely two-celled; partition formed by the *inflexed margin of the lower suture*.

Oxytropis is distinguished by its fruit, which, like *Astragalus*, is imperfectly two-celled, and the partition is formed by the *inflexed margin of the upper suture*.

VI. **Lotus**, Linn. Bird's-foot Trefoil. Annual or perennial herbaceous, rarely shrubby plants. Leaves ternate, with leaf-like stipules. Flowers solitary or umbellate, on long axillary stalks. Calyx tubular, with five nearly equal teeth. Petals deciduous. Standard spreading, with a rounded, broad, vaulted claw, wings converging at their upper margin; keel ascending with a narrow point, protuberant, with narrow, short, distinct claws. Style bent, stigma simple. Legume cylindrical, one-celled, separated by a spongy substance into several spurious or incompletely separated cells. Seeds one in each.

1. **L. corniculatus**, Linn. Common Bird's-foot Trefoil. E. B. 2090, L. C. 283. Stems spreading or ascending. Leaflets obovate or obovate-oblong, entire. Stipules ovate-cordate, leaf-like, somewhat pointed. Flowers in terminal, dense clusters, three-six, sometimes almost solitary. Divisions of the calyx triangular-lanceolate, shorter than the tube, *erect before flowering*. Keel-petals united as far as the middle. Fruit glabrous, ending with the permanent, almost straight style. Commons, heaths, and pastures. Perennial. June.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—950 yards. T. 52°—38°.

Var. *β. tenuis*. *L. decumbens*, Forst. in "Eng. Fl.," vol. iii., p. 314. Stems very slender, elongated; leaflets and stipules narrow; flowers few or solitary.

A. 15, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

Var. *γ. villosus*. Upper parts of the plant and calyx hairy; hairs long, spreading.

Var. *δ. crassifolius*. Leaflets fleshy. Flowers large, solitary (sometimes two).

2. ***L. major***, Scop. Large Bird's-foot Trefoil. E. B. 2091, L. C. 284. Root tufted, tapering. Stems ascending or erect, with a few long hairs, hollow. Leaflets obovate or oblong, broad, entire, *thin, hairy*; stipules broad, oval, or somewhat cordate, obscurely toothed and pointed. Heads eight-ten-flowered. Calyx-teeth linear, shorter than the tube (about as long as the tube), hairy, ciliate, *spreading in bud* (an inconstant character). In *L. major* the teeth are more subulate and elongate than in *L. corniculatus*, but in this they often spread as much as they do in the former. The two species are not distinguished by very prominent characters. In moist places. Perennial. June—September.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—100 yards. T. 52°—46°.

Var. *β. glabriusculus*. Plant entirely glabrous; calyx-teeth scarcely ciliated.

3. ***L. angustissimus***, Linn. Narrow-leaved Bird's-foot Trefoil. E. B. 925, L. C. 285. Stem ascending or procumbent, slender, round, hairy, leafy, branching widely. Lower leaflets obovate, upper oblong, pointed, all very hairy; stipules ovate-lanceolate, acute. Flower-stalks long, weak, spreading, one-two-flowered. Calyx-teeth *linear-tapering*, about twice as long as the calyx-tube. Keel with its spur longer than either the helmet or wings of the corolla. Legume (pod) linear, narrow, straight, undulated, six times the length of the calyx, terminated by the long, slender, tapering, persistent style. South of England, near the sea. Annual. May—July.

A. 1, C. 2. Lat. 50°—51°. Alt. ? T. 52.

Var. *β. seringianus*, Bab. Peduncles of the flower and fruit as long as the leaves. Stem ascending.

4. ***L. hispidus***, Desf. Hairy Bird's-foot Trefoil. E. B. 2823, L. C. 285 b. Stems thicker than they are in *L. angustissimus*, also the stipules are broader and blunter. Peduncles two-four-flowered. Wings of the corolla *attenuated* and rounded at the apex. Legume *rugose, only about twice as long as the calyx*, about twice as thick as in the above species. Near the sea in Devon and Cornwall. Annual. May—August.

Area as in *angustissimus* (?).

VII. ***Medicago***, Linn. Annual or perennial herbaceous plants, with trifoliate stipulate leaves. Flowers clustered or spiked, axillary or terminal, usually yellow. Calyx campanulate, in five divisions. Corolla caducous. Stamens diadelphous (in two parcels). Style filiform, glabrous. Legume reniform (oblong), falcate or spirally con-

volute (somewhat like a screw), usually indehiscent (not opening). Seeds kidney-shaped, smooth.

SECT. I.—*Lupularia*. Legume not spinous.

1. **M. lupulina**, Linn. Black Medick, or None-such. E. B. 971, L. C. 260. Root slender. Stems erect, ascending or spreading, much branched, slightly pubescent. Leaflets obovate, cuneate at the base, notched or entire at the apex, and toothed (often obcordate and mucronate); stipules lanceolate, pointed, entire. Flowers yellow, small, in oblong heads (spikes), *on short pedicels*; peduncles axillary, and longer than the leaves. Legumes *reniform*, pubescent or glabrous, with prominent ridges, one-seeded, curved, *black* when quite ripe. Dry pastures, meadows, and waste ground. Annual. June—September.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

2. **M. sativa**, Linn. Lucern. E. B. 1749, L. C. 258. Roots long. Stems stout, ascending or erect, slightly hollow. Leaflets oblong, toothed above and pointed. Stipules lanceolate-subulate, entire or toothed, slightly membranous. Flowers blue or violet, *on very short pedicels*, in terminal or lateral clusters, on long axillary peduncles. Legume elongated, many-seeded, falcate rather than spiral. Cultivated and occasionally subspontaneous. Perennial. July—September.

It is only partially naturalized in the environs of Paris.—Coss and Ger., 128.

3. **M. sylvestris**, Fries. Wild Medick. L. C. 258*. Stem quadrangular, pithy, ascending. Leaflets obovate-oblong, dentate on the margin of their upper half, notched, mucronate. Peduncle many-flowered; pedicels shorter than the calyx, longer than the bract. Flowers yellow or blackish-green. Legume *annular* (*with one flat turn*). Sandy and gravelly places in Norfolk and Suffolk. Perennial. June, July.

This species is unnoticed in the “Cybele Britannica.”

4. **M. falcata**, Linn. Yellow Sickle Medick. E. B. 1016, L. C. 259. Roots thick, persistent, spreading. Stems erect or ascending, with erect, slightly pubescent, and leafy branches. Leaflets oblong or cuneate, toothed above and mucronate; stipules lanceolate-subulate, half-herbaceous, entire or slightly toothed. Flowers yellowish or greenish-white, on peduncles which are longer than the leaves; the pedicels are about as long as the bracts, and *shorter than the calyx*. Legumes elongate, *falcate* (like a reaping-hook), many-seeded. Perennial. June, July.

A. 3, C. 7. Lat. 50°—53°. Alt. ? T. 51°—48°.

SECT. II.—Legume spinous, spirally convoluted.

5. **M. maculata**, Sibth. Spotted Medick. E. B. 1616, L. C. 261. Stem spreading, ascending or erect, angular and furrowed. Leaflets obovate or obcordate, toothed above, tapering, and entire below, *with a dark brown or purplish spot*; stipules toothed. Flowers in clusters, three-four, or solitary, *on very short peduncles*. Legumes

Medica, Bateriaea, at
Medicago² from Wandsworth July, 31

Stem roundish reddish, erect

Leaflets obovate-obcordate, fleshy

Smooth with red veins, about $\frac{2}{3}$ toothed

Peduncles many flowered

Petioles herbaceous lanceolate

Flowers yellow, small

Pods flat annular slightly downy
& wrinkled reflexed. Probably annual

obcordate or broadly obovate, truncate or depressed, and toothed at the apex, on short, stout petioles, which are about as long as the leaves; stipules small, *laciniated* with unequal linear-setaceous segments (the teeth are long and pointed). Flowers small, solitary or several (one-ten), on axillary peduncles, which are about as long as the leaves. Legume glabrous, with prominent external ridges, and a single row of very long, tapering, slender, curved spines (the spines are longer than the semi-diameter of the legume, the spiral has at least three turns). Blackheath, with the former. Annual. July—September.

A. 4, C. 9. Lat. 50°—53°. Alt. ? T. 52°—49°.

Var. *M. apiculata*. Spines straight and shorter than in *M. denticulata*. Near the Itchin, Southampton, and at Wandsworth steamboat pier, with the following exotic species:—

Medicago, sp. Stem stout, erect, furrowed. Leaflets oblong, narrow. Peduncles stout, erect, longer than the leaves. Flowers rather large, pale yellow, in lax heads (capitate), on pedicels scarcely as long as the scarious smooth calyx. The whole herbage is quite smooth. Wandsworth. Annual. August.

M. orbicularis, All., Moris Fl. Sard. 37. Stems weak, sulcate, slightly hairy. Leaflets obovate-cuneate at the base, hairy. (Leaves often ovate, and they become red when decaying.) Stipules *laciniate*, with long, linear-lanceolate, pointed segments. Peduncles hairy, slender, shorter than the leaves, one-two- or more-flowered. Flowers very small, yellow; calyx hairy. Legume large, with five to six turns of the spiral, ridged without spines, smooth. Wandsworth. Annual. August.

M. scutellata, All., Moris Fl. Sard. 37. Stems simple or branched, angular, prostrate, smooth or puberulent, hairy above, leafy. Leaflets cuneate or deltoid, the upper (odd one) rhomboid or rounded, all toothed on the upper margin; stipules with horizontal teeth. Peduncles slender, one-two-flowered, not quite so long as the leaves; pedicels very short, subtended by two scarious, awned, minute bracts. Flowers small, yellow; teeth of the calyx subulate, longer than the tube. Fruit five to six turns of the spiral, ridged, large, smooth or slightly puberulent. Wandsworth steam-boat pier. Annual. June—August.

M. tenoreana (?), D. C., Tenore Fl. Nap. 178. Stem hairy, round, slender, leafy. Leaves stalked. Leaflets cuneate, upper one roundish or oblong, all toothed and hairy. Flowers solitary or in pairs, small, yellow, on long, slender, hairy flower-stalks (longer than the leaves); calyx scarious, with very unequal setaceous teeth. Legume hairy, consisting of four spiral turns, crowned with the style. Wandsworth steam-boat pier. Annual. July—September.

M. ciliaris, Willd., Moris Fl. Sard. 51. Bur Medick. Stems procumbent, much branched, straggling, smooth. Leaves smooth, obovate, rather fleshy, slightly toothed; stipules dilated, herbaceous, with numerous unequal pointed teeth. Flowers solitary, small, yellow on long peduncles. Fruit perfectly globular, with long ciliate teeth. Annual. Wandsworth steam-boat pier, September 15th, 1857.

VIII. Melilotus, Tourn. Annual or biennial plants, with strong, woody, vertical, tapering roots. Stems erect or reclining, round, tapering, branched, leafy. Leaves trifoliate. Flowers yellow, rarely white; calyx campanulate, with five erect, slender teeth. Corolla caducous; standard equalling or surpassing the wings; keel obtuse, adhering to the wings. Stamens diadelphous (in two parcels). Legume straight, longer than the calyx, oblong, *one-four-seeded*.

1. *M. officinalis*, Willd. Common Melilot. Honey- or Sweet-Lotus. E. B. 1340, L. C. 264. Stems two-three feet high, erect, glabrous, leafy. Leaves on short petioles. Leaflets oblong, elliptic, often linear, truncate, toothed. Stipules subulate, setaceous, enlarged at the base. Flowers yellow, numerous, in slender, lax, lateral and terminal clusters, on very short, filiform pedicels, which are reflexed when in fruit. *Standards scarcely longer than the wings*. Legume wrinkled transversely, oblong, attenuated at the summit, furnished with *appressed hairs*, and terminated by the long slender style. In waste places; sometimes in fields. Biennial. June—September.

A. 12, C. 40. Lat. 50°—57°. Alt. 0—100 yards. T. 52°—47°.

Var. (?) Flowers very small, in dense, cylindrical-conical, narrow spikes; the whole plant slenderer and weaker than the common form. Wandsworth.

2. *M. vulgaris*, Willd. *M. leucantha*, Koch. White Melilot. E. B. 2689, L. C. 265. Stem as in *M. officinalis*. Leaves on rather longer stalks, with broader, obovate or ovate, toothed leaflets.

Flowers *white*, in shorter clusters than those of *M. officinalis*. *Standard longer than the wings*. Legume oblong or obovate, attenuated at the apex, wrinkled transversely, containing three-four ovules. In waste and gravelly places. Biennial. June—September.

Alien.

Wandsworth Common, in the railway cutting opposite the prison, it has for several years maintained its settlement on heaps of clayey mould.

3. *M. arvensis*, Wallr. Field Melilot. E. B. 2960, L. C. 264*. Stems erect, round, branching, leafy. Leaflets obovate (?) (elliptical-lanceolate), with wide, unequal teeth. Clusters elongated, very much longer than the leaves (the upper or terminal clusters are branched, and subtended by a single leaflet or bract). Flowers white. Legume *glabrous*, obtuse, oblong-ovate, transversely wrinkled, terminated by the style, usually two-seeded. In corn-fields, &c. Annual. July, August.

Alien.

Note.—The distinctive characters of these three sorts, *M. officinalis*, *M. vulgaris*, and *M. arvensis*, are very obscure.

M. parviflora, Desf. L. C. p. 16. Coss and Ger., Fig. 11, G. Stems erect or diffuse, usually much branched, cylindrical, striated, leafy. Leaflets oblong or obovate, toothed. Flowers yellow, *small*. Pod granulose, containing one large shagreened seed. Steam-boat pier, Wandsworth. Annual. June—September.

Alien; will probably be naturalized.

This species, which is readily distinguished from those above described by its humble growth, small yellow flowers, reticulated, rugose, globular, small, sessile legumes, and by its one or two ovate, finely tubercled seeds, is spreading over the few cultivated fields that still remain between Wandsworth (where it originated) and Battersea. If it gain a settlement in the *allotments* below Lavender Hill and Battersea Rise, it will be safe for some time.

M. messanensis, Desf., Moris Fl. Sard. 58. Stems ascending, branched, leafy. Leaflets obovate, cuneate, toothed on the upper half, slightly notched at the apex; stipules almost scarious, small, acuminate, mostly entire or toothed at the base. Clusters of small, yellow flowers, shorter than the leaves, on a short, common peduncle. Legume ovate-elliptical, acute, terminated by the persistent style, with *numerous prominent contiguous concentric ridges*. Rubbish on the shore of the Itchin, Southampton, and at Wandsworth steam-boat pier; abundant in both places, especially in the latter. Annual. July—September.

M. parviflora and *M. messanensis* have been seen as stragglers about Manchester.

M. cærulea, Pers., Lam. Encyc. 613. Stems erect, smooth, angular and furrowed, with erect branches. Leaves linear-lanceolate or obovate-cuneate, toothed only on their upper half. Clusters short, dense, nearly capitate, on peduncles which are much longer than the leaves. Flowers whitish, with blue veins, in dense ovate or

globular heads. Legumes turgid, ovate-round, with a long beak. Seeds two, ovate, rounded. Wandsworth, with the preceding, but not common. Annual. July, August.

This species is an economical plant; it is employed to flavour cheese and to scent snuff. All the species have a more or less agreeable smell when dry; this odour they retain in the herbarium for many years.

M. sulcata, Desf., Moris Fl. Sard. 59. Stem erect, six-ten inches high, sulcate, leafy. Leaves obovate or oblong, cuneate, toothed in their upper half. Clusters dense, cylindrical, on peduncles which are longer than the leaves. Flowers deep yellow; standard much longer than the wings. Only the var. *β. major*, Cambess., has been collected at Wandsworth. It is distinguished from the var. *a.* by its deep green leaves and its dense cluster.

IX. Trifolium, Linn. Annual or perennial herbaceous plants, with trifoliate stipulate leaves. Flowers in capitate clusters (heads), or in short spikes. Calyx campanulate or tubular, in five divisions (five-toothed or five-cleft). Corolla often gamopetalous (petals cohering), withering, persistent. Stamens diadelphous (in two parcels), more or less cohering to the petals. Legume small, entirely covered by the calyx (rarely a little longer than the calyx), ovate or slightly oblong, one-seeded, rarely two-four-seeded, scarcely opening. Seeds roundish, very smooth.

SECT. I.—Flowers yellow, and becoming scarious after flowering (*floration*); throat of calyx naked; legume stipitate.

1. **T. filiforme**, Linn. *T. minus*, Sm. Lesser Yellow Trefoil. E. B. 1256. L. C. 282 and 282*. Roots fibrous, tubercular. Stems spreading-diffuse or ascending, glabrous or slightly pubescent, very slender. Leaflets obovate or obcordate, toothed on the upper part, the central leaflet petiolate, the lateral pair sessile; stipules ovate or ovate-oblong, pointed or tapering to a point. Heads (capitules) lax, five-twenty-flowered, on long, filiform peduncles. Standard plicate or keeled, scarcely longer than the wings, not striated or with very fine longitudinal *striae*. Style much shorter than the fruit. In wet, gravelly places. Annual. May—September.

A. 18, C. 80. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—46°.

Var. *β. pauciflorum*? *T. filiforme*, Sm. E. B. 1257. Stems very slender; heads two-eight-flowered.

2. **T. procumbens**, Linn. Hop Trefoil. E. B. 945, L. C. 281. Stems spreading, reclining or ascending, more or less downy, with two deep channels. Leaflets oblong or obovate, usually notched, toothed above, the central leaflet petioled. Stipules acuminate, with setaceous teeth. Heads round, many-flowered, stalked. Flowers sulfur- (sulphur-) coloured, very numerous, *helmet strongly striated*, spreading, *much longer than the wings*. Style very short. Waysides; dry, sandy places. Annual. June.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

SECT. II.—Flowers purple, roseate, or white, rarely yellow, in heads or spikes; legume sessile.

§ 1. Flowers sessile, or nearly so; calyx hairy or glabrous, with a prominent ring; teeth ciliated.

3. **T. pratense**, Linn. Purple Clover. E. B. 1770, L. C. 271. Stem angular, hollow, ridged and grooved, pubescent or smooth, leafy. Leaves elliptical, tapering at both ends, more or less hairy, often marked with pale-green bands; stipules herbaceo-membranous, awned. Heads *sessile, ovate, dense*. Calyx-teeth not quite so long as the corolla. (These characters are variable.) Pastures; common; often cultivated. Perennial. June. September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—600 yards. T. 52°—40°.

Var. *β. parviflorum*. Heads not sessile; calyx-teeth as long or longer than the corolla.

T. medium is distinguished from *T. pratense* by its round, flexuous (often wiry), and solid stem, and by its more elongate uniformly pale-green leaflets, by its *herbaceous lanceolate stipules*, by its stalked heads, and by the long setaceous hairy teeth of the calyx.

4. **T. medium**, Linn. Zigzag Trefoil. E. B. 190, L. C. 272. Stem ascending, flexuous or zigzag, solid or nearly solid. Leaflets oblong, all more or less narrowed at both ends; stipules herbaceous (membranous), with prominent green nerves and lanceolate-linear or setaceous teeth. Flowers on *short peduncles*, in the centre of the leaves or in the axils when twin flowers are produced. Calyx-throat closed when in fruit, with a hairy ring; teeth slightly spreading, lanceolate-linear (filiform), four of them equal, one double the length of the others. Fruit compressed, obovate, crowned with the slender persistent style (?). Grassy places; both in woods and in fields. Perennial. June—September.

A. 18, C. 75. Lat. 50°—61°. Alt. 0—350 yards. T. 51°—43°.

In the Highlands this species is often very handsome. In the dried-up channels of streams it is sometimes found with a round, wiry, rigid stem.

5. **T. ochroleucum**, Linn. Sulphur-coloured Trefoil. E. B. 1224, L. C. 269. Stems ascending, pubescent, round, leafy. Leaflets oblong, entire, pubescent above, silky below; stipules herbaceous, the free portion *linear or subulate*, hairy. Flowers cream-colour; heads oblong, solitary, rarely in pairs. Calyx-divisions lanceolate, hairy, spreading when in fruit. Standard much longer than the wings, compressed. In dry, gravelly places, chiefly in the East of England. Many examples have been observed near Wandsworth steam-boat pier. Perennial. June—August.

A. 3, C. 9. Lat. 50°—53°. Alt. 0—100 yards. T. 49°—48°.

T. incarnatum, Linn. Italian Clover. E. B. 2950, L. C. p. 15, in List of Excluded Species. Stems hollow, erect, sulcate, very downy, six-thirty inches high. Leaflets obovate-roundish or obovate-cuneate, toothed on their upper part, downy on both sides; stipules ovate, obtuse, membranous, herbaceous near the summit. Flowers in oblong-cylindrical, solitary and terminal spikes, bright purple (car-

nation), without bracts at the base of the spike. Calyx very hairy, about half as long as the corolla; the divisions are much spread when in fruit. Only here and there of partially spontaneous growth. It has been cultivated for upwards of twenty years, and springs up occasionally in fields and waste places. Annual. June—August.

Alien.

Var. *β. Molinieri*, Balb. Flowers pale-rose; plant smaller, with obcordate leaflets. Lizard Point, Cornwall.—Rev. W. S. Hore, in "Phytologist," vol. ii., p. 237.*

6. *T. stellatum*, Linn. Starry-headed Trefoil. E. B. 1545, L. C. 274. Stems erect or ascending. Leaflets small, obcordate, cuneate at the base, dentate at the summit; stipules ovate, toothed, obtuse. Heads globular, lax, solitary, terminal, on long, hairy peduncles. Calyx-throat closed, with woolly hairs; divisions of the calyx lanceolate, elongate, with prominent reticulations, hairy, equal, and radiating, much longer than the tube. Seed large, ovate, smooth. On the sea-beach, near Shoreham, Sussex. Annual. July—August. Wandsworth steam-boat pier; very few examples.

A. 1, C. 1. Lat. 50°—51°. Alt. ? T. 51°.

7. *T. arvense*, Linn. Hare's-foot Trefoil. E. B. 944, L. C. 275. Stems usually several, slender, erect, much branched and hairy. Leaves on short petioles, nearly sessile. Leaflets oblong, linear, blunt or truncate, with silky hairs on both sides; stipules acuminate-awned. Flowers white or roseate, *on oblong, cylindrical, blunt spikes*, without bracts. Divisions of the calyx subulate, *setaceous, almost equal, longer than the corolla*, more or less spreading when in fruit; the teeth are beautifully fringed with long, whitish hairs. Sandy fields. Annual. July—September.

A. 17, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

8. *T. striatum*, Linn. Soft Knotted Trefoil. E. B. 1843, L. C. 277. Stems spreading or erect or ascending, very downy, four-six inches high. Leaflets obovate or oblong, toothed at the apex; stipules ovate, acute, awned, almost membranous. Flowers in ovate, sessile, or shortly pedunculate heads, elongated after flowering, pale-white or roseate, with bracts at their base. Divisions of the calyx *linear subulate*, very hairy, spreading or erect when in fruit. Tube urceolate or somewhat globular when in fruit. Dry, sandy places. Annual, June, July.

A. 14, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

This species is distinguished from the following principally by its less rigid calyx-teeth.

* "Whether the plant (Var. *β. Molinieri*) is a mere variety of *T. incarnatum* I much doubt, and therefore avail myself of the present opportunity to point out the difference between its characters and those found in the diagnoses of the typical form, as given by Koch, Babington, and others. The Lizard plant is in most cases *prostrate*, but sometimes with a tendency to ascend; the stipules are *narrow, ovate, and acute; the throat naked*," &c., &c. The author adds: "Whether these discrepancies are of sufficient importance to justify a separation of the two plants, I leave to more able botanists to determine. I should state that not a single specimen with a red corolla was to be seen among the countless numbers which we observed on this and the former occasions."

9. *T. scabrum*, Linn. Rough Trefoil. E. B. 903, L. C. 276. Stems slender, rigid, prostrate or ascending, flexuous, branching, downy, a few inches high, about the same height as the stem of *T. striatum*. Heads ovate, oblong after flowering, solitary, axillary, and terminal. Flowers pale white or pink. Calyx-tube oblong, slightly enlarged under the limb, coriaceous, hairy, the throat is shut by two callous processes. Divisions of the calyx rigid, somewhat spinous, ~~divergent~~. Dry sandy places. Annual. June, July.

ds. T. 52°—48°.

E. B. 2868, L. C.

Leaflets obovate or it; stipules veined, or in pairs, dense,

Calyx-tube membranaceous, which is not callous, imbricate, spinous at one as long as the Annual. July.

Trefoil. E. B. 220, g (often prostrate), as the primary axis. Tire or only feebly cute. Heads ovate, ile, mostly terminal. teral callosities, like *te-acuminate*, finally al. June—August. 49°.

are unequal. There *T. Xatardii*, D.C. (?) m-boat pier.

underground) Trefoil. r woolly, prostrate, ghtly toothed, pubescent. Flowers yellow, on stout peduncles.

Calyx of the fertile by the barren calyxes, and form a kind of il, in which it is natural standard of the corolla wings are much larger, dark, large and shining. June.

ards. T. 52°—48°.

of the calyx glabrous or

Round-headed Trefoil.

Trefoil hybridum. Stem stout furrowed

leaves prostrate on long foot-stalks. leaflets
 (monoton toothed); stipules broad scarious with long
 tapering entire points. Heads globular without an
 involucre. Calyx-teeth equal long beccaceous
 Corolla purplish, streaked. Legume 2-seeded?
 Note I have a very small specimen of this from

near Sandenhead Dorset. Aug 5. 1859.

E. B. 1063, L. C. 278. Root annual. Stems spreading or erect; glabrous. Leaves obovate-cuneate or roundish, with wide, sharp, ascending teeth and prominent nerves, glabrous on both sides; stipules entire, ovate-acute, awned, scarious. Flowers sessile, roseate, the standard being much longer than the wings, in round, dense, usually solitary heads. Calyx *glabrous*, with ovate, lanceolate teeth, shorter than the corolla, *spreading when enclosing the fruit*. Seeds ovate-reniform. In dry, gravelly places. Annual. June, July.

A. 5, C. 9. Lat. 50°—53°. Alt. 0—50 yards. T. 51°—49°.

14. **T. strictum**, Linn. Erect Trefoil. E. B. 2949, L. C. 278*. Root annual. Stems erect or spreading, branched, stouter than in *T. glomeratum*, leafy. Leaflets *oblong-linear*, or obovate or cuneate, strongly toothed, glabrous on both sides; stipules large, *dilated, ovate*, scarious, sharply toothed. Heads dense, round, stalked, axillary, and terminal. Calyx-teeth subulate, nearly as long as the corolla. Fruit obovate, compressed, glabrous, *much longer than the tube of the calyx*. Seeds ovate. Jersey. Annual. August.

A Channel Islands' plant. (Sarnian).

15. **T. suffocatum**, Linn. Suffocated Trefoil. E. B. 1049, L. C. 279. Stems short, branching, prostrate, *usually buried in the sand* where they grow. Leaves much longer than the stem, with obovate leaflets, cuneate at the base, and often notched and toothed at the apex; stipules ovate, abruptly acuminate. Heads small, ovate, contiguous, sessile, axillary. Calyx-tube ovate, with almost equal lanceolate-subulate teeth. Seeds *two*, lenticular, notched. On sandy sea-shores; rare. Annual. May—July.

A. 5, C. 10. Lat. 50°—54. Alt. ? T. 52°—49°.

16. **T. repens**, Linn. White Trefoil, or Dutch Clover. E. B. 1769, L. C. 267. Stems prostrate and rooting. Leaflets obovate or rhomboidal, blunt or notched, bordered with pointed teeth; stipules lanceolate, abruptly subulate. Heads globular, on peduncles, which are as long as the leaves. Flowers on pedicels, *which are ultimately reflexed*. Calyx-tube campanulate, with lanceolate, subulate divisions, the upper contiguous, longer than the lower. Legume linear, turgid, bearing three-four roundish, notched seeds. Pastures and moist places; very common. Perennial. May—October.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards. T. 52°—38°.

17. **T. ornithopodioides**, Linn. *Trigonella ornithopodioides*, D. C. and L. C. Bird's-foot Trefoil. E. B. 1047, L. C. 266. Stems spreading and prostrate, usually very short (two-six inches long). Leaflets obovate, cuneate at the base, truncate or notched at the apex, serrated with sharply subulate teeth; stipules lanceolate-subulate, entire. Flowers few (one-five), usually *pedunculate*. Divisions of the calyx (teeth) nearly equal, longer than the tube. Standard longer than the wings. Legume *pubescent, linear, compressed, obtuse, elongate, containing many ovate, smooth seeds* (six-eight). Dry, sandy, and gravelly places. Wandsworth Common. Annual. June, July.

A. 10, C. 20. Lat. 50°—57°. Alt. 0—100 yards. T. 52°—48°.

SECT. III.—Heads many-flowered; corolla withering; throat of the calyx naked, becoming inflated when in fruit (forming a head like a strawberry); legume sessile.

18. **T. fragiferum**, Linn. Strawberry-headed Trefoil. E. B. 1050, L. C. 280. Stems reclining and rooting, furrowed on one side, glabrous or pubescent. Leaflets roundish-obovate, toothed, glabrous; stipules membranous, entire, lanceolate, awned. Heads round, subtended by scarious bracts. Peduncles axillary, much longer than the leaves. Calyx pubescent, with silky hairs, and with linear-subulate divisions, inflated, membranous and reticulate in fruit. Waysides. Perennial. July—September.

A. 14, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—48°.

T. resupinatum, Linn. Reversed Trefoil. E. B. 2789, L. C. Excluded Species. Root annual. Stem slender, prostrate or ascending. Leaflets obovate, rounded, toothed, with *lanceolate, elongate* stipules, ovate at the base, lanceolate-subulate above. Peduncles about as long as the leaves. Flowers in rather lax, hemispherical heads, purplish, twice as long as the calyx. Fruit in strawberry-like clusters, formed by the inflated calyx. At Wandsworth steam-boat pier. Annual, June—September.

A. 3(?). Lat. 51°. Alt. 0—50 yards.

This species may readily be known by its elegant purplish flowers, and when in fruit by its inflated calyxes, forming a globular head, like that of *T. fragiferum*.

Trifolium spupsum, Linn. Stem branching from the base, leafy. Leaflets obovate-toothed. Heads nearly sessile. Flowers roseate-purple. Calyx membranous, smooth, with long, filiform or setaceous teeth. Calyx of the fruit inflated, striated. Legume elongate, three-four-seeded, with a long beak. Wandsworth steam-boat pier. Annual. July, August.

Only noticed one season, and then but few examples occurred.

This locality, Thames-side, near the steam-boat pier so frequently mentioned, produced, in addition to the above, the following rare species of this genus, viz., *T. resupinatum*, plentiful and large specimens; also *T. maritimum*, var. *Xatardii*, and *T. ochroleucum*, only small forms, and *T. stellatum*. The *Melilots*, *Medicks*, *Trigonellas*, &c., were very abundant and fine.

X. **Astragalus**, Linn in part. Perennial plants, with somewhat woody roots. Leaves *unequally* pinnate. Flowers in axillary clusters. Calyx tubular or campanulate, with five teeth. Standard of the corolla longer than the wings. Keel obtuse. Stamens diadelphous. Legume elongate, curved, many-seeded, *two-celled by the inflexion of the dorsal nerve* (the lower suture).

1. **A. glycyphyllus**, Linn. Sweet Milk-Vetch, Wild Liquorice. E. B. 203, L. C. 286. Stems spreading or ascending (often quite prostrate), *angular, flexuous*, leafy. Leaves all petiolate, with numerous pairs of leaflets and an odd one (four-twelve pairs); leaflets

ovate-oblong, entire; stipules herbaceous, *ovate-oblong, pointed*, free. Peduncles axillary, stout, shorter than the leaves. Flowers greenish-yellow, in dense clusters. Legume somewhat three-angled, tapering at the point, smooth or puberulent, curved and stipitate (on a short stalk). In woods and bushy places. Perennial. June—August.

A. 14, C. 50. Lat. 50° — 58° . Alt. 0—200 yards. T. 51° — 47° .

2. **A. hypoglottis**, Linn. Purple Mountain Milk-Vetch. E. B. 274, L. C. 287. Root slender, woody, creeping. Stems *round*, slender, flexuous, clothed with long, white hairs (only on the recent stems), prostrate, two-six inches long. Leaflets in numerous pairs with an odd one (six-twelve on each side), small, oblong, obtuse, hairy on both sides; hairs white, scattered; *stipules united*. Peduncles longer than the leaves, with lanceolate, membranous bracts. Flowers *purple, in a globular cluster*. Calyx tubular, with appressed hairs, and linear-lanceolate teeth. Legumes erect, *ovate or cordate at the base*, pointed. Seeds black, reniform. On heaths, sea-coasts, &c. Arthur's Seat, Edinburgh. Perennial. June—July.

A. 9, C. 25. Lat. 51° — 58° . Alt. 0—200 yards. T. 48° — 46° .

3. **A. alpinus**, Linn. Alpine Milk-Vetch. E. B. 2717, L. C. 288. Stem slender, clothed with soft hairs, six-twelve inches long, prostrate, elongate. Leaves with ten-twelve pairs of hairy, ovate or elliptical, blunt leaflets; stipules ovate, pointed, *free* (or sometimes slightly combined). Peduncles as long as the leaves. Flowers few, *white with purple tips, in capitate spikes* (dense clusters). Legumes oblong, tapering at both ends, stalked, pendulous(?), enveloped in the calyx(?), covered with black hairs when young. On mountains in Clova and Braemar. Perennial. July.

A. 1, C. 2. Lat. 56° — 58° . Alt. 800—900 yards. T. 38° — 37° .

XI. Oxytropis, D. C. Leaves mostly radical (in the British species); leaflets numerous, with an odd terminal one. Calyx in five divisions. Keel of the corolla *apiculate* (having a narrow point). Legume incompletely two-celled (the cells are formed by the inflexed margin of the upper suture).

1. **O. campestris**, D. C. Yellowish Mountain Oxytropis. E. B. 252, L. C. 290. Stem *short, procumbent* (root producing a tuft of leaves and one or two flowering-stalks). Leaves with ten-fifteen pairs of ovate or lanceolate leaflets. Flowers six-ten, in a short, *roundish or ovate cluster*. Calyx tubular, with linear teeth, covered with appressed yellow hairs. Legume ovate, apiculate. Seeds reniform. Caithness, discovered by Mr. R. Dick. Clova Mountains. Perennial. July.

The range of this plant must be extended.

A. 1, C. 1. Lat. 56° — 57° . Alt. 700 yards. T. 41° — 40° .

2. **O. uralensis**, D. C. *O. Halleri*, Bunge. Hairy Mountain Oxytropis. E. B. 466, L. C. 289. Root woody. Leaves radical, stalked, with scarious adnate stipules. Leaflets ovate, acute, eight-twelve pairs, whitish and silky on both sides. Flowers on erect, radical peduncles, which are longer than the leaves; the whole herb-

age is remarkably *silky*. Flowers bracteate, of a rich bluish-purple. Calyx tubular, densely hairy, with short, blunt teeth. Legume ovate-oblong, pointed, with a membranous partition, crowned with the permanent style. Mountains in Scotland, on a sandy soil. Perennial. July.

A. 4, C. 6. Lat. 54°—59°. Alt. ? T. 48°—45°.

TRIBE II.—**Vicieæ**. Leaves *equally* pinnate, terminating in a *tendril* (rarely in a sharp point); stamens diadelphous or monadelphous; legume one-celled (rarely with cellular cross partitions). Cotyledons *remaining underground after germination*.

XII. Vicia, Tourn. Annual, biennial, or perennial herbaceous plants, with equally pinnate leaves and numerous leaflets, terminating in branched tendrils; stipules herbaceous, often half arrow-shaped. Flowers axillary. Calyx tubular, campanulate, with equal or unequal teeth. Style *filiform*. Legume many-seeded and elongated or short and few-seeded. Seeds rounded, angular, or compressed, with an oblong or linear hilum.

SECT. I.—Flowers solitary or in pairs (clustered in *V. sepium*). Corolla longer than the calyx. Style bearded just below the summit.

1. **V. sativa**, Linn. Common Vetch. E. B. 334, L. C. 298. Stem angular, scarcely winged and slightly hairy, leafy. Leaves with three-seven pairs of leaflets, with dilated, toothed, herbaceous stipules; leaflets elliptical-linear, only apparently notched, hairy, plicate, mucronate. Calyx ribbed, slightly hairy, with nearly equal teeth. Flowers single, on very short pedicels. Corolla a deep purple (not red). Legume slightly hairy. On Barnes Common; not rare. Annual. May—September.

A. 18, C. 80. Lat. 50°—59°. Alt. 0—200 yards. T. 52°—46°.

Var. β . Stem hairy. Leaflets all uniform, linear-oblong, truncate or notched with a longish mucro. Flowers solitary, sessile, purplish-blue. Calyx-teeth subulate, ciliate. Pods densely hairy or silky when young.

Var. γ . Densely hairy. Leaflets obovate, deeply notched, with a long mucro. Flower and pods as in var. β .

Var. δ . Stem smooth. Leaflets nearly smooth, blunt, without a mucro. Peduncles twice as long as the flowers. Calyx-teeth unequal, short, downy, not hairy as in the above variety, oblong, flattish, not at all tapering, about six-seeded, wrinkled and smooth.

These varieties grew on mud laid on Battersea Fields, among other exotic rarities.

2. **V. lathyroides**, Linn. Spring Vetch. E. B. 30, L. C. 299. Stems procumbent, branched, four-five inches long. Leaflets obcordate or oblong, notched, usually in three pairs, usually only with the rudiment of a tendril. Stipules entire, without the depressed spot of *V. sativa*, &c. Flowers solitary, sessile, small, purple. Legumes

erect, smooth. Seeds cubicular, tubercled. On dry pastures, banks, and roadsides. Annual. April, May.

A. 17, C. 50. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

3. **V. lutea**, Linn. Rough-podded Yellow Vetch. E. B. 481, L. C. 300. Stem procumbent, twisted, ridged and furrowed, hairy, leafy. Leaves in six-eight pairs, with elliptic, lanceolate, apiculate leaflets; stipules three-cleft, with triangular lobes, of one colour or spotted. Calyx-teeth very unequal, two of them very long, erect, the others short, and more or less spreading. Corolla yellowish-white; helmet (standard) glabrous, dilated. Legumes elliptic-oblong, hairy. Whole herbage hairy; hairs of the legume bulbous at the root. Wadsworth steam-boat pier. Perennial. June—September.

A. 5, C. 9. Lat. 50° — 57° . Alt. 0—200 yards. T. 52° — 47° .

4. **V. lævigata**, Linn. Smooth-podded Vetch. E. B. 483, L. C. List of Excluded Species. Root perennial, tuberous. Stems nearly erect, six-twelve inches high. Leaflets oblong, notched, mucronate, in about four pairs, quite smooth as well as the stem; stipules short, with a lateral lobe. Flowers larger than in the preceding, pale-blue or whitish. Legume always smooth. This appears to be the only distinction between the above and some of the following species or forms. On the pebbly beach, Weymouth. Unknown in recent years. Perennial. July—September.

5. **V. hybrida**, Linn. Hairy-flowered Yellow Vetch. E. B. 482. Stems ascending, hairy. Leaflets oblong or obovate, notched or entire and mucronate, about six pairs; stipules ovate. Flowers solitary, large, yellow, more or less veined with purple. Standard hairy. Legumes reflexed, hairy. Glastonbury, Somerset. Perennial. June, July.

Smith says that the essential specific difference between these two species consists in the standard of *V. hybrida* "being clothed externally with abundance of shining yellow hairs."

6. **V. sepium**, Linn. Bush Vetch. E. B. 1515, L. C. 301. Stem straggling, branched, leafy, winged or angular. Leaflets ovate, mucronate, in four-eight pairs; stipules toothed, teeth pointed. Flowers in axillary clusters, on short peduncles. Calyx tubular, hairy, with short, unequal teeth. Standard dilated, longer than the wings. Legumes oblong (scimitar-shaped), black when the fruit is ripe. Seeds globular, black, speckled with white; hilum linear, white, surrounding half the circumference. Hedges and woods. Perennial. June—September.

A. 18, C. 81. Lat. 50° — 60° . Alt. 0—650 yards. T. 51° — 40° .

Var. *B. montana*, Koch (?). Leaflets ovate-lanceolate, truncate.

7. **V. bithynica**, Linn. Rough-podded Purple Vetch. E. B. 1842, L. C. 302. Root perennial. Stems slender, angular, glabrous, spreading, leafy. Leaflets lanceolate or linear, pointed, one pair on the lower, and two pairs on the upper leaf-stalks; stipules lanceolate, with fringed teeth. Flowers solitary, axillary, on stalks which are shorter than the leaves. Calyx tubular, with long pointed teeth. Standard purple. Legumes tumid, hairy. Seeds six, globular,

speckled. There is a variety of this plant with narrowly linear leaves and narrower stipules. In bushy, gravelly places near the sea. It was gathered at Battersea in 1853 and 1854, on mud laid on the fields, with several other foreigners. Perennial. July—September.

A. 7, C. 15. Lat. 51°—54°. Alt. 0—100 yards. T. 52°—48°.

SECT. II.—Flowers clustered, rarely solitary by abortion. Common peduncles much longer than the pedicels. Corolla much longer than the calyx. Style pubescent or almost glabrous.

8. **V. Cracca**, Linn. Tufted Vetch. E. B. 1168, L. C. 297. Root perennial. Stem climbing, angular, furrowed, hairy or puberulent; tendrils long, branched, and coiled. Leaflets oblong, linear or lanceolate, tapering, or obtuse and mucronate, eight-ten pairs; stipules herbaceous, half arrow-shaped, entire, lanceolate. Flowers numerous, bluish violet, on peduncles which are not longer than the leaves. Calyx-teeth very unequal, the upper two very short, nearly obsolete, the other three subulate, the central one longer than the lateral ones, the tube partly coloured. Corolla much longer than the calyx. Standard not longer than the wings, obcordate, with rounded lobes. Legumes reflexed or spreading, oblong, glabrous. Seeds roundish, smooth when ripe, *with a prominent linear kilum, which half encircles the seed*. Hedges. Perennial. June—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—800 yards. T. 51°—38°.

V. tenuifolia, Roth. Stems angular, furrowed, slightly pubescent or glabrous. Leaves on stout horizontal stalks, with eight-ten pairs of linear pointed leaflets, ending in small branching tendrils. Stipules linear, one with a divaricate lobe (half sagittate), the other entire. Flowers numerous on long spreading stalks (peduncles) longer than the leaves. Standard reflexed, pinkish, longer than the wings. Calyx-teeth very unequal. Legumes few-seeded, oblong, reflexed or spreading. Battersea Fields, July 20. Perennial (?). July—September.

In this species the cluster of flowers is laxer and more elongated than in *V. Cracca*. The seeds also are larger than in the former species, and only one-fourth part of their circumference is embraced by the funicle.

V. Gerardi, Vill. This form, of which a few examples were collected on the mud or soil laid on Battersea Park, differs from *V. Cracca* by its more rigid stems, denser clusters of intensely blue flowers, narrower leaflets, fewer seeds, and more obviously by the *shagginess* of every part of the plant.

V. villosa, Roth. *V. polyphylla*, W. and K. Stem angular, furrowed, climbing, pubescent or hairy, branched and straggling. Leaves at right angles to the stem, on stout petioles (common leaf-stalks), with eight-ten hairy, lanceolate or oblong-linear, entire leaflets, all mucronate, with long branching tendrils; stipules very hairy, one of them with a lobe at the base (half-sagittate), and toothed towards the apex, the other entire. Flowers in dense

clusters, on stout horizontal peduncles, which are about equal to the leaves. Standard bluish purple, spreading, wings white, quite as long as the standard. Legumes broad, smooth, oblong, few-seeded. In this variety or form the leaflets descend to the base of the common petiole, or are contiguous to the stem; the calyx is coloured with very unequal teeth; the legumes are rhomboid and reflected. Battersea Fields; not unfrequent during several seasons. Annual. July.

9. *V. hirsuta*, Koch. Hairy-podded Tare. E. B. 970, L. C. 303. Stems angular, grooved, glabrous, leafy. Leaflets five-eight pairs, linear-elliptical or oblong, obtuse or truncate, mucronate; stipules linear, entire or incised, with long, spreading, setaceous teeth. Flowers small, pale blue, in groups (clusters) of from three to eight, on peduncles which are about as long as the leaves. Calyx-teeth linear-subulate, rather longer than the tube, and about as long as the corolla. Legumes oblong, hairy, two-seeded. Seeds *roundish, slightly compressed*, smooth. In fields. Annual. May—September.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—300 yards. T. 51°—44°.

A variety of the above has flat oblong pods, which are quite smooth, strongly reticulate, with three-seven small, flattish, wrinkled, ovate seeds, with a very short hilum (the hilum does not embrace above one-fourth or one-fifth of the circumference of the seed). Battersea Fields. *V. angustifolia* (?), Fries. Annual (?). August (?).

10. *V. tetrasperma*, Moench. Smooth-podded Tare. E. B. 1223, L. C. 304. Root annual. Stems weak, straggling, climbing, branched and leafy, angular, smooth. Leaflets linear, acute, mucronate, two-four pairs, with very long tendrils. Flowers one-two, on very slender pedicels, which are shorter than the leaves. Calyx-teeth slightly unequal, acute. Standard longer than the wings, pale pink, with deep purplish lines. Pods oblong, four-seeded, glabrous. Grassy places; about fields and meadows. Annual. July—September.

A. 14, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

Erum pubescens? Stems numerous from the same root, quite prostrate, and spreading in all directions. Leaflets linear, narrow, notched and mucronate. Flowers one or several, on short, hairy peduncles. Legume dilated, oblong, hairy, terminated by the style. Seeds about four. Battersea Fields (Park), on mud or soil.

V. gracilis, Lois. Slender Vetch. E. B. 2904. "Plant larger than *V. tetrasperma*, and of a somewhat glaucous hue. Leaflets much longer, narrower, and more acuminate than in the above, seldom exceeding three pairs, and they are singularly erect. Peduncles longer than the leaves, one-six-seven-flowered. Legume six-seeded. Seeds small, reddish-brown, obscurely mottled with black. Hilum very short, scarcely longer than broad. Cornfields, near West Cowes."—"Flora Vectensis."

In the "Phytologist," vol. iii, pp. 280, 281, Dr. Bromfield states:—"In cultivated fields, woods, and hedges, not unfrequent, and sometimes very abundant, in the Isle of Wight, but uncertain and capri-

cious in its stations. I am still more than half inclined to regard it as a mere variety of the last (*V. tetrasperma*), finding most of its characters prone to variation; but in deference to the opinion of others I here keep it distinct."

11. **V. sylvatica**, Linn. Wood Vetch. E. B. 79, L. C. 296. Root creeping. Stems several, spreading, trailing and climbing, angular, glabrous, zigzag, leafy. Leaves on stout, spreading leaf-stalks; leaflets ovate-elliptical, with a short point, five-ten pairs, with branched curling tendrils; stipules small, fringed with slender teeth. Flowers drooping, blue and white, in clusters on stout peduncles, which are longer than the leaves. Pedicels as long as the calyxes. Calyx truncate, with short, erect teeth. Standard dilated, finely marked with purple lines. Legume about an inch long, not rough. Seeds roundish, few. A very elegant plant. Woods and hedges; rare. Perennial. July—September.

A. 17, C. 60. Lat. 50°—58°. Alt. 0—500 yards. T. 50°—42°.

12. **V. Orobus**, D.C. Wood Bitter Vetch. E. B. 518, L. C. 295. Stems numerous, erect or ascending, one-two feet high. Leaves terminating in a sharp point (mucro), not in a tendril; leaflets oblong, obtuse, mucronate, six-fourteen pairs, the lowest pair contiguous to the stem; stipules slightly toothed at the base, half-hastate, entire or slightly toothed. Flowers numerous, with purplish streaks, on long peduncles (longer than the leaves). Lower teeth of the calyx lanceolate-subulate. Standard *tapering into a broad claw*. Legumes smooth, yellow when at maturity. Seeds ovate-compressed, *smooth*; hilum occupying about half the circumference of the seed. Woods in upland rocky places. Perennial. May—July.

A. 8, C. 20. Lat. 51°—58°. Alt. 0—200 yards. T. 48°—46°.

XIII. Lathyrus, Linn. Annual or perennial plants, with angular or winged stems and equally pinnate leaves; tendrils branched (in *L. Aphaca* the stipule is leaf-like, and in *L. Nissolia* the stalk is dilated, but the leaflets are abortive in both). Calyx companulate, five-cleft or five-toothed, the two upper teeth being shorter than the lower three. Style *flat, linear or dilated at the apex*. Legume oblong or linear, many-seeded. Seeds globular or slightly compressed, with an oblong or linear hilum.

SECT. I.—Leaflets one-four pairs; rach terminating in a tendril.

§ 1. Roots perennial; peduncles many-flowered (*L. macrorrhizus* two-flowered).

1. **L. pratensis**, Linn. Meadow Vetchling. E. B. 670, L. C. 308. Stem climbing or straggling, branched, leafy, *angular*. Leaflets in pairs, lanceolate, tapering at the base, pointed, strongly ribbed on the under surface; stipules (*sagittate, ovate-oblong, acuminate*) lanceolate, with a single, setaceous, spreading tooth at the base. Peduncles longer than the leaves, *many-flowered*. Flowers *yellow*, in a close cluster. Calyx cylindrical, with short, nearly equal teeth. Standard

dilated, longer than the wings. Legumes oblong, scimitar-shaped, many-seeded, reticulate. Seeds large, with a small hilum, black when ripe. Meadows and hedges. Perennial. July—September.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—350 yards. T. 52° — 43° .

2. **L. sylvestris**, Linn. Narrow-leaved Everlasting Pea. E. B. 805, L. C. 310. Root branching. Stems *broadly-winged*. Leaflets *oblong-lanceolate*, mucronate, in single pairs on *broadly-winged leaf-stalks*; stipules linear or setaceous, elongate. Flowers *roseate*, on long peduncles. Legumes oblong-linear, finely reticulate, glabrous. Seeds round, slightly shagreened, the hilum half surrounding them. Hedges and bushy places; not common. Perennial. June—August.

A. 12, C. 40. Lat. 50° — 56° . Alt. 0—200 yards. T. 52° — 48° .

3. **L. latifolius**, Linn. Broad-leaved Everlasting Pea. E. B. 1108, L. C. List of Excluded Species. Stem climbing, with *very broad wings* and spreading branches. Leaves on a winged petiole, with a single pair of *elliptical leaflets*, and terminating in a stout, branched tendril. Flowers numerous, on stout peduncles, which are much longer than the leaves. Legume compressed, beautifully veined (nerved). Seeds numerous, round or ovate, tubercled; hilum *about one-third of the circumference*. Hedges. Perennial. July, August. In a hedge near Yapton, Sussex.

Alien.

This species is reputed to be a doubtful native, but from its tendencies to keep its place (its retentive hold of the soil), it might be presumed to have a strong claim to nationality. As it produces a great quantity of leafy stems and branches, it might be worth while to try its value as a fodder-plant. It will grow in very poor soil. A plant was observed in 1856 growing vigorously on the verge of a gravel-pit on Wandsworth Common.

4. **L. macrorhizus**, Wimm. *Orobis tuberosus*, Linn. and Sm., and L. C. Common Bitter Vetch. Heath Pea. E. B. 1153, L. C. 312. Roots slender, creeping, furnished with rounded tubercles (knobs). Stems narrowly winged, ascending. Leaves with two-four pairs of elliptical leaflets, which end in *setaceous points*; stipules half arrow-shaped, entire or toothed. Flowers two-four, on a peduncle which usually surpasses the leaves. Calyx-teeth *very* unequal, the upper short, convergent. Legume nearly cylindrical, tapering at the base, black when mature. Seeds round, smooth, hilum occupying about one-third of the circumference of the seed. On heaths and in woods. Perennial. May—August.

A. 18, C. 80. Lat. 50° — 61° . Alt. 0—700 yards. T. 51° — 40° .

Var. β . *Orobis tenuifolius*, Roth. Leaflets narrow, linear-lanceolate. Not rare in North Wales.

5. **L. niger**, Wimm. *Orobis niger*, Linn. and Sm. Black Bitter Vetch. E. B. 2788, L. C. 313. Stems angular, *not winged*, erect, much branched. Leaflets in *three-six pairs*, oblong-elliptical (ovate-oblong), obtuse and apiculate (with a small mucro), the common petiole (rach) ending in a subulate point (not with a tendril). Flowers four-eight, on common peduncles, which surpass the leaves.

Calyx-teeth unequal, the upper short, triangular convergent. Legume linear, slightly compressed, tapering at the base, finely veined. Seeds ovate, with a linear hilum, which is equal to one-third of the circumference of the seed. The whole herbage turns black in drying. This character is not peculiar to *L. niger*; *L. macrorhizus* sometimes assumes this colour in the herbarium. Mountainous passes in Scotland; rare. Perennial. June, July.

A. 1, C. 2. Lat. 56°—57°. Alt. 0—200 yards. T. 45°—?

6. *L. maritimus*, Fr. *Pisum maritimum*, Linn. and Sm. Seaside Pea. E. B. 1046, L. C. 311. Stem angular, not winged, reclining at the base, erect upwards, flexuous. Leaves on a *non-winged* petiole, terminating in a simple or branched tendril; leaflets *elliptical* or *oblong*, in four-six pairs; *stipules leaf-like, ovate, cordate at the base*. Flowers numerous, on erect and stout peduncles, which are not much more than half as long as the leaves. Calyx-teeth unequal, the upper short, triangular, and converging. Legume compressed, cuneate at the base, terminated by the long, flattened style. Seeds numerous, black, smooth; hilum one-third of the circumference of the seed. On pebbly sea-beaches; rare. Perennial. July, August.

A. 5, C. 5. Lat. 50°—61°. Alt. ? T. 51°—47°.

Var *β. acutifolius*, Bab. Leaves elliptic-lanceolate, acute. Burra-firth, Unst, Shetland. Edmonston, "Fl. Shetland," p. 31.

SECT. II.—Roots annual or perennial; peduncles one-three- or many-flowered.

7. *L. palustris*, Linn. Marsh Everlasting Pea. E. B. 169, L. C. 309. Stems slender, *winged*. Leaflets *linear-lanceolate, pointed, in two-three pairs*, common petiole terminating in a slender, branching tendril; stipules half arrow-shaped, often very slender (setaceous). Flowers *bluish*, one, three, or several, on a slender common peduncle, which is rather longer than the leaves. Calyx-teeth unequal; the upper short, triangular, converging. Legume linear, smooth, compressed, cuneate at the base, strongly reticulate. Seeds round, compressed; hilum equal to one-fourth of the circumference of the seed. Boggy meadows in the west of England. Perennial. June—August.

A. 6, C. 12. Lat. 51°—54°. Alt. 0—100 yards. T. 50°—48°.

Var. *β. linearifolius*, Sering. Leaves narrow, linear-lanceolate, acute. Has this variety been observed in England?

8. *L. hirsutus*, Linn. Rough-podded Vetchling. E. B. 1255, L. C. 307. Stem slender, with *narrow wings*, slightly branched. Leaves on a short not-winged petiole, ending in a tendril, consisting of a *single pair* of elliptical or oblong-linear leaflets; stipules narrow, half arrow-shaped. Peduncles one-two-flowered, longer than the leaves. Calyx-teeth nearly *equal*, ovate, acuminate. Legume oblong, compressed, keeled, covered with long woolly hairs, which grow out of a tubercular base. Seeds round, *tubercular, with a short hilum*. East of England; rare. Annual. June—August. Essex, not far from Southend.

A. 2, C. 2. Lat. 51°—52°. Alt. 50 yards. T. 50°—49°.

9. **L. Nissolia**, Linn. Crimson Vetchling. E. B. 112, L. C. 306. Stems rigid, slender, erect, angular, *not winged*. Leaves and stipules (?) abortive (the petiole is elongate, flattened, and leaf-like); leaf-like petioles linear-lanceolate, tapering, ribbed, quite entire; stipules minute (Sm.) Flowers usually solitary, on a long filiform peduncle, shorter than the leaf (petiole). Legume oblong-linear, tapering at the apex, longitudinally veined (nerved). Seeds ovate, tubercled, with a very short hilum. In bushy and grassy places; rare. Annual. June, July.

A. 6—10 (?), C. 20. Lat. 50°—53°. Alt. 100 yards. T. 51°—48°.

10. **L. Aphaca**, Linn. Yellow Vetchling or Grass Vetchling. E. B. 1167, L. C. 305. Stems angular, weak, usually prostrate, branched. Leaves abortive (only a long, slender, coiled tendril is developed); stipules large (*like two opposite leaves*), *cordate-saggitate*. Flowers on long, slender peduncles, one-two (rarely two), *yellow*. Calyx-teeth almost equal, linear-acute, spreading. Legume compressed, oblong, reticulate. Seeds ovate, smooth, with a very short hilum. Sandy and gravelly fields; rare. Annual. May—August.

A. 5—9 (?), C. 20. Lat. 50°—53°. Alt. 100 yards. T. 51°—48°.

TRIBE III.—**Hedysarææ**. Leaves unequally pinnate. Legume divided transversely into one-seeded joints.

SYNOPSIS OF THE GENERA.

Ornithopus.—Flowers solitary or few.

Arthrolobium.—Flowers on peduncles; legume elongate.

Hippocrepis.—Flowers numerous, umbellate, yellow.

Onobrychis.—Flowers numerous, in spike-like clusters.

XIV. **Ornithopus**, Linn. Annual plants, with unequally pinnate leaves and small flowers, which are either solitary or in few-flowered umbels. Calyx tubular, campanulate, with five almost equal teeth. Legume linear, curved, with *oblong, slightly-compressed joints*.

O. perpusillus, Linn. Bird's-foot. E. B. 369, L. C. 291. Root annual. Stems spreading or ascending, diffuse, very pubescent. Leaflets numerous, oblong, small; stipules triangular, scarious, barely visible. Peduncles one-four-flowered. Legume hairy, strongly reticulate, terminated by a short and slender beak. Sandy places. Annual. June—September.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—150 yards. T. 51°—46°.

Var. *β. leiocarpus*. Legume glabrous.

XV. **Arthrolobium**, Desv. Leaves pinnate, in many pairs, Flowers pedunculate. Calyx tubular, with five nearly equal teeth. Keel of the corolla blunt. Legume elongated, cylindrical, consisting of many one-seeded joints, which are scarcely contracted at their junctions, not opening.

1. **A. ebracteatum**, D. C. Sand Joint-Vetch. E. B. 2844,

L. C. 292. Stem round, prostrate, branching, leafy. Leaves on short leaf-stalks; leaflets in numerous pairs, with an odd terminal one, oblong-elliptical; stipules minute, scarious (?). Flowers few, small, yellow, on peduncles which are about as long as the leaves. Legumes linear, torulose, with cylindrical joints, curved somewhat like a sickle. There is a minute scale at the base of each pedicel (the foot-stalk of an individual flower), but no leafy bract.—(Babington). Hence the specific name, *ebracteatum*, "without a bract." Channel and Scilly Islands. Annual. June, July.

A. 1, C. 1. Lat. 49°—50°. Alt. ? T. 53°—52°.

2. *A. scorpioides*. Stem very slender, simple, leafy. Leaves trifoliate, with a large, obovate, terminal leaflet, and two very small rounded, reniform, lateral leaflets, subtended by two scarious-membranous bracts. Calyx truncate, with small teeth. Corolla yellow. Legumes linear elongate. Wandsworth steam-boat pier, June, 1857.

XVI. **Hippocrepis**, Linn. Perennial, ligneous-rooted plants, with unequally pinnate leaves and yellow umbellate flowers, on long axillary and terminal peduncles. Calyx campanulate, with nearly equal teeth. Corolla keeled. Stamens diadelphous. Legume linear, sinuate, with *compressed, crescent-shaped joints*.

H. comosa, Linn. Horse-shoe Vetch. E. B. 31, L. C. 293. Stem spreading, prostrate at the base, ascending, glabrous, four-six inches high. Leaflets numerous, oblong, obtuse or notched, slightly mucronulate; stipules partly herbaceous, small. Umbel consisting of four-eight yellow flowers, on long, leafless peduncles. Legume straight or curved, with crescent-like rough joints, terminated by a compressed beak. On dry, chalky places. Perennial. May—August.

A. 10, C. 25. Lat. 50°—55°. Alt. 0—600 yards. T. 51°—42°.

XVII. **Onobrychis**, Tourn. *Hedysarum*, Linn. Herbaceous or shrubby perennial plants, with unequally pinnate leaves. Flowers numerous, on long, axillary, naked peduncles. Calyx campanulate, with five nearly equal, subulate divisions (teeth). Keel of the corolla obliquely truncate. Stamens diadelphous. Legume consisting of a *single compressed joint, one-seeded, reticulate*. Seeds reniform.

O. sativa, Lam. *Hedysarum Onobrychis*, Linn. and Sm. Saintfoin. E. B. 96, L. C. 294. Root somewhat woody. Stems reclining, round, furrowed, leafy, two-three feet high. Leaves in numerous pairs, with an odd leaflet; leaflets uniform, oblong-elliptical, pointed; stipules ovate, entire, pointed. Peduncles longer than the leaves, clusters (spikes) dense, with numerous interspersed bracts. Flowers crimson or pink, beautifully striped. Legumes bordered with sharp teeth and reticulated with prominent partly spinous ribs (nerves).—Sm. Often cultivated as a fodder plant, hence it has become naturalized on open chalky or calcareous places. Perennial. June—August.

A. 8, C. 20. Lat. 50°—55°. Alt. 0—200 yards. T. 50°—48°.

Coronilla. *C. varia*, Linn. Stems herbaceous, spreading, ascending, glabrous, branched and leafy. Leaves in four-ten pairs, with an odd one, with oblong-obtuse, petiolate, mucronate, notched leaflets; stipules free, herbaceous or slightly scarious. Flowers a pale rose-colour, in dense many-flowered umbels, on long, axillary peduncles. Legumes triangular (cylindrical, with a deep groove on one side, and a ridge on the other), with a long filiform beak. In dry banky places on the Continent. It occasionally grows spontaneously in the South of England. Yarmouth, Isle of Wight, and Chelsea.

Trifolium tomentosum has been seen in fields near Dorking, Surrey.

T. elegans has also been seen in England.

ORDER XCIV.—**RHAMNACEÆ**, D. C. THE BUCKTHORN FAMILY.

Trees or shrubs, with simple, alternate, rarely opposite leaves, minute stipules and axillary or terminal flowers. Calyx four-five-cleft. Petals as many as the calycine lobes, or wanting. Stamens opposite to the petals. Ovary two-three- or four-celled, with solitary erect ovules in each cell. Fruit either dry and separating in three divisions, or baccate.



Fig. 191. — *Rhamnus catharticus*. 1, Sprig in flower, reduced; 2, flower; 3, sprig in fruit, reduced; 4, fruit.

Rhamnus, Linn. Small trees or shrubs, with abortive branches, which often become spines. Leaves oblong or ovate, glabrous. Calyx urceolate, usually in four-five divisions (four-five-cleft). Petals equal to the number of calyx-divisions, small, sometimes imperfect or wanting. Stamens four, inserted in the mouth of the calyx, short, with roundish, two-lobed, small anthers. Ovary on a glandular disk, with a short style, and a two-three- or four-lobed stigma. Fruit globular, succulent, containing two-four one-seeded, leathery-cartilaginous nuts.

1. *R. catharticus*, Linn. Purg-ing Buckthorn. E. B. 1629, L. C. 246. Small tree, usually very much branched, with a spine in the forks (an abortive terminal branch). Leaves roundish-ovate or elliptical, abruptly pointed, finely toothed, arranged in

rosettes at the base of the flowering branches, downy at the base.

Flowers yellowish-green, perfect, *diœcious* or polygamous, in tufts on very short spurs (lateral branches). Style two-three-cleft. Fruit black. Woods and hedges. Tree. Flower, May, June. Fruit, August, September.

A. 12, C. 40. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—47°.

2. **R. Frangula**, Linn. Alder Buckthorn. E. B. 250, L. C. 247. Shrub. Stem three-six feet high, branching. Branches opposite or alternate, numerous, blackish, not spinous. Leaves *obovate*, elliptical, or roundish, with very short abrupt points, scattered, contiguous on the upper part of the branches. Flowers *perfect*, pale whitish-green, aggregate, axillary, rarely single. Style short, simple. Fruit red at first, dark *purple* when ripe, with two large seeds. In woods and thickets. Flowers, May. Fruit, August, September.

A. 13, C. 30. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

††† Petals and stamens on the receptacle (torus), ovary free.

* Placentation parietal. (See p. 148.)

Violaceæ are known by their stipulate simple leaves and spurred irregular corolla; *Cistaceæ*, by their entire revolute leaves, fugacious petals and indefinite stamens; *Cruciferae*, by their cruciate flowers, definite stamens and siliquose fruit; *Fumariaceæ*, by their succulent brittle stems, definite connected stamens, and irregular corollas; *Papaveraceæ*, by their large cruciate corollas, indefinite stamens, and many-seeded ovaries; *Nymphaeaceæ*, by their large, succulent, floating leaves, large flowers, and by the indefinite number of their floral organs; *Resedaceæ*, by their many-parted calyx, lacerated petals, and one-celled and three-lobed ovary; *Droseraceæ*, by their circinate leaves, glandular hairs, and erect flower-stalks; *Hypericaceæ*, by their large yellow flowers and indefinite stamens in three or more parcels.

ORDER XCV.—**VIOLACEÆ**, D. C. THE VIOLET FAMILY.

Annual or perennial herbaceous plants or shrubs. Leaves simple, entire, stipulate, usually alternate. Sepals five, persistent. Petals five, equal or unequal, generally withering, with obliquely convolute aestivation (prefloration). Stamens five, with dilated filaments, elongated beyond the anthers. Ovary one-celled, many-seeded, rarely one-seeded, with three parietal placentæ. Style one, with an oblique-hooded stigma. Capsule three-valved, with loculicidal dehiscence. Seeds horizontal or pendulous. Embryo straight, in a thick, fleshy albumen (perisperm). Radicle towards the hilum.

Viola, Linn. Violet. Mostly herbaceous plants, with either trailing or erect stems or without a stem. Leaves simple, usually alternate, crenate, serrated or deeply divided (stipulate). Sepals five, erect, acute, prolonged at their base. Petals five, unequal, one terminating in a spur. Stamens with short filaments and coherent anthers. Ovary roundish, with a long style and a pointed or concave stigma. Capsule one-celled, three-valved, with several seeds.

SECT. I.—Upper petal erect, the lateral and lower petals pendant, stigma more or less bent, usually pointed.

§ 1. Stemless or nearly so.

1. **V. palustris**, Linn. Marsh Violet. E. B. 444; L. C. 132. Root creeping, rhizomatous, *without stolons*. The radical peduncle supplies the place of a stem. Leaves rounded, reniform, blunt, *glabrous*, radical, petiolate. Flowers pale, scentless. Corolla with a short blunt spur. Capsules oblong, three-angled, glabrous, on erect peduncles, which are curved at the top. Bogs; in mountainous and hilly districts. Perennial. April—July.

A. 18, C. 70. Lat. 50°—60°. Alt. 0—1300 yards. T. 50°—34°.

2. **V. odorata**, Linn. Sweet Violet. E. B. 619, L. C. 133. Root fleshy and fibrous, *stoloniferous*. Leaves radical, or on the



Fig. 192.—*Viola odorata*. 1, Plant in flower; 2, single flower; 3, united anthers and hooked connective; 4, combined anthers; 5, a single stamen with its appendage; 6, horizontal section of ovary; 7, capsule; 8, capsule, open; 9, transverse and vertical section of seed.

rooting stolons, deeply cordate, reniform or ovate, crenulate, pubescent. Stipules lanceolate, ciliate, scarious, or herbaceous. Flowers blue or white, *very odoriferous*. Peduncles of the fruit reclining. Capsule roundish, hairy. Shady and grassy places. Perennial. March—May.

A. 15, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

The stolons often bear abortive flowers as well as leaves, which shows that the tendency of the plant is to become caulescent.

Var. *alba* is a species according to some continental authorities.

3. *V. hirta*, Linn. Hairy Violet. E. B. 894, L. C. 134. Root without stolons. Leaves like those in *V. odorata*, but hairy; stipules lanceolate, acute, feebly fringed. Sepals ovate, rounded at the apex. Petals slightly notched (emarginate), the lateral pair closely fringed. Capsule downy. On chalky banks, ~~Common~~. Perennial. April—

A. 14, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

Mr. Baker, in the new series of the "Phytologist," pp. 76—79, maintains the identity of the two usually received species, and asserts that "*they are modifications of a single specific type produced by the influences of situation.*" Mr. Cheshire, in the same periodical, pp. 494—497, urges their specific distinctness. Mr. Cheshire's distinctive marks are: *V. odorata*, odorous; leaves as long as the flowers at the time of flowering, generally as broad as long. *V. hirta*, inodorous; leaves shorter than the flowers at the time of flowering, generally one-half longer than broad.

§ 2. With a stem.

4. *V. sylvestris*, Lam. *V. sylvatica*, Fr. *V. canina*? Smith in "English Flora." Dog's Violet, E. B. 620. *V. flavicornis*, Forst. in E. B. 2736. L. C. 135 (?). Root simple or branching, fleshy or woody, surrounded near the crown with the bases of the decayed leaves, not stoloniferous. Primary or central stem woody at the base, barren. Flowering stems lateral, ascending, more or less leafy and branched. Leaves reniform or cordate, crenulate, pointed, stalked; stipules toothed, lanceolate. Pedicels axillary, elongate, bracteate near the flower. Sepals narrow, lanceolate, scarious at the margin, two of them produced at the base, the three others shorter. Spur pale blue or somewhat white. Capsule oblong, triquetrous, glabrous, with two intermediate rounded ridges and with a tapering point. Seeds smooth, shining, obovate. On banks and open places. Perennial. April—September.

A variety of this Violet from Barnes Common and other open places in Surrey agrees with the above in specific characters, though much reduced in the size of its organs. The leaves are rather more leathery and more finely crenulate. The bracts are also similarly situated, and the lateral petals have a similar tuft of hairs on one side above the claw.

Var. *α. sylvatica*, Fr. The common form as described above.

Var. *β. flavicornis*. E. B. 2736. This is distinguished from the former, *α. sylvatica*, by its more leathery (coriaceous) plane, not wrinkled leaves, and its deeper blue flowers, with a pale yellowish spur. On dry open places. In all these forms there is always present a barren or flowerless stem which bears only a rosette of leaves, whence flowering-shoots are developed next season.

5. *V. canina*, Linn. (?) *V. flavicornis*, Sm. and of L. C. 135*. *V. pumila*, Hooker and Arnott. Primary and lateral stems elongated and flowering. None of the stems or shoots in this form are barren. Leaves cordate, oblong, rounded at the apex (not acuminate, as in *V.*

sylvestris. Stipules ciliated or toothed. Bracts contiguous to the flower. Sepals acute, protracted, and notched at the base. Spur longer than the calycine appendages. Sandy places. Near New Brighton, Cheshire. Mr. Sansom.

6. **V. lactea**, Sm. *V. pumila*, Vill.(?) Dillenius' Violet. E. B. 445, L. C. 135*. Primary and lateral stems producing flowers. Leaves ovate, oblong, or lanceolate, the lower ones somewhat cordate at the base. Stipules serrated or fringed. Bracts membranous, lanceolate, toothed. Sepals acuminate. Spur longer than the calycine appendages. Flowers pale blue or whitish. Heathy, dry, sandy places. Perennial. April—September.

Var. *a. V. canina*, Fries (?). Leaves cordate at the base; stipules fringed or toothed.

Var. *β. flavicornis*, Sm. Leaves rounded at the base; stipules serrated or incised.

7. **V. stagnina**, Kit. Haller's Violet. Reich., 4507. According to Reichenbach this is *V. lactea*, Sm. L. C. 135*. Root slender, rhizomatous. Primary and lateral stems producing flowers. Leaves ovate-lanceolate, somewhat cordate at the base; petioles winged towards the top (Hooker and Arnott); stipules serrated or incised, linear-lanceolate, shorter than the petioles. Sepals acuminate. Spur short and blunt. Flowers pale blue, nearly white. Turfy bogs; rare. Botisham Fen, near Cambridge. Perennial. May—July.

SECT. II.—All the petals erect, except the lower, which is pendulous or horizontal; stigma roundish, urceolate.

8. **V. lutea**, Huds. Yellow Mountain Violet, or Yellow Pansy. E. B. 721, L. C. 137. Stem ascending, diffuse, filiform underground, branched (stem unbranched, Sm.) Lower leaves ovate or cordate, upper ovate or lanceolate, crenate or serrate, slightly fringed; stipules pinnatifid, with a large entire terminal lobe. Spur about as long as the calycine appendages. Sepals acute. Flowers large, handsome. Mountainous pastures. Common in Wales and in the north-west of Derbyshire, Yorkshire, and Scotland. Perennial. May—September.

A. 14, C. 50. Lat. 51°—59°. Alt. 0—900 yards. T. 47°—38°.

V. Curtisii, Curtis's Violet. E. B. 2693. Sepals pinnatifid, with lanceolate linear lobes, upper lobe but slightly more dilated than the lateral ones. On sandy places, near the West Coast.

9. **V. tricolor**, Linn. Heart's-ease. Pansy. E. B. 1287. L. C. 136. Stems solitary or several, reclining at the base or erect, branching, glabrous, winged. Leaves ovate-lanceolate, deeply toothed or crenulate, the lower on petioles and somewhat cordate. Stipules leafy, pinnatifid, with narrow lateral lobes and a broader terminal crenulate one often as large as the leaves. Flowers yellow and purple; lower petal spurred; spur longer than the basal prolongation of the sepals. Peduncles long, rather erect, bent at the top. Fruit capsular, ovate-oblong, triangular, glabrous. In fields and gardens. Annual. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

Var. *a. arvensis*. E. B. 2712. Petals slightly longer than the

calyx, yellow, rarely tinged with violet. In fields and cultivated places.

In a paper in the "Phytologist," N. S., vol. i., p. 512, Mr. Baker states that the form *V. Curtisii* grows about the estuary of the Torridge, in Devon, and Aberffraw, in Anglesea. Another form, *V. sabulosa*, Boreau, occurs on the Cheshire coast in the neighbourhood of New Brighton. The first-mentioned variety resembles *V. lutea*, and the second *V. tricolor*. The learned author of this paper inclines to the belief that these two plants belong neither to *V. lutea* nor to *V. tricolor*, but to the representative of a third series, *V. rothomagensis*, the Rouen Violet, which has been reported as a native, in the vicinity of Tunbridge Wells.

ORDER XCVI. ~~CISTACEÆ~~ D. C. THE ROCK-ROSE FA-

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SECT. I.—Leaves, the upper at least, furnished with stipules.

1. **H. vulgare**, Gært. *Cistus Helianthemum*, Linn. Common Rock-Rose. E. B. 1321, L. C. 128. Stems half-shrubby, spreading,

branching, downy. Leaves opposite, on short petioles, oblong, with reflexed borders, upper surface green, lower surface white, tomentose; stipules linear-lanceolate. Flowers yellow, in *short terminal clusters*, inflexed before expansion, *bracteate*. Pedicels of the fruit reflexed. Style persistent, twice as long as the ovary. Dry open places. May—August.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—650 yards. T. 51°—41°.

Var. *a. tomentosum*. Leaves whitish or tomentose on the under side. A common state.

Var. *β. virescens*. Leaves green on both sides.

Var. *γ*. Flowers white or rosy (?); *roseum*, D. C.

Var. *leptopetalum*. Petals narrow (?); *surrejanum*, Mill.

A variety with copper-coloured petals occurs at Sanderstead, near Croydon, a locality which abounds in varieties of this species.



Fig. 193.—*Cistus creticus*. 3, Ovary, cut to show the attachment of the ovules; 5, the capsule, opening, showing the five valves.

2. *H. polifolium*, Pers. (Arnott?). *Cistus polifolius*, Linn., and Sm., "Eng. Fl." White Mountain Cistus. E. B. 1322, L. C. 129. Root oblique. Stems shrubby, round; young shoots densely downy. Leaves oblong-linear, with revolute edges, *densely downy and hoary on both*

sides, opposite and stipulate. Sepals more or less hairy and scarious, with red ribs and minute papillæ (nipples) scattered over its surface. Petals white (yellow?), with yellow claws. Capsule shaggy. Brean Downs, Somersetshire; Torquay, Devon. Shrub. June—August.

Agrees very closely with No. 1. The smaller white flowers and the hairier leaves are the prominent distinctions.

A. 1, C. 2. Lat. 50°—52°. Alt? T. 51°—50°.

SECT. II.—Leaves without stipules.

3. *H. guttatum*, Mill. Spotted Cistus. E. B. 544, L. C. 131. Root rigid, fusiform, annual. Stems several or solitary, herbaceous, erect, more or less branched, clothed with long, spreading, white hairs. Leaves oblong-lanceolate, hairy, the lower opposite; upper ones alternate, stipulate, or without stipules. Flowers yellow, usually with a deep red (brown?) spot at the base of each petal, in lax elongated clusters, *without bracts*. Fruit bearing calyxes on spreading ascending pedicels. Stigma nearly sessile. Jersey. Sandy hill above Petit Port. Mr. H. C. Watson. Annual. June—August. Sarnian and Hibernian.

H. Breweri, Planch. "Lond. Journal of Bot.," 111, 618, Tab. 21. Stems herbaceous, erect, branching. Leaves obovate, blunt, without stipules; upper leaves linear. Clusters bracteate. Petals narrow, yellow. Fruit erect. Holyhead, Anglesea. Annual. June—August.

4. **H. ledifolium**, Willd. Ledum-leaved Cistus. E. B. 2414, L. C. p. 16, List C. Stems herbaceous, erect, with a long tapering root. Leaves oblong-lanceolate, the lower opposite, the upper alternate, almost sessile. Flowers opposite to the alternate leaves, with *inconspicuous and very fugacious petals*. Fruit large, angular, glossy. Brean Downs, Somerset. "Not found for many years, and probably an error."—Babington. Annual. June—July.

5. **H. canum**, Dun. Hoary Dwarf Cistus. E. B. 386, L. C. 130. Stem *shrubby*, erect, and spreading, a few inches high, with strong, rigid roots. Leaves opposite, oblong-ovate, on short, flat stalks, hoary beneath. Flowers *small*, yellow, in pairs (?), terminal. Style twisted (zigzag). Capsule ovate, smooth, with three or four hairy lines. Limestone rocks in the north of England and Wales. Great Orme's head. Carnarvonshire. Perennial. May, June.

A. 4, C. 8. Lat. 51°—55°. Alt. 0—650 yards. T. 50°—42°.

ORDER XCVII.—**CRUCIFERÆ**, Juss. THE CRUCIFEROUS FAMILY.

Annual or perennial, herbaceous, rarely half-shrubby plants, with watery, often acrid juice. Leaves alternate, simple or compound, sessile or petiolate, without stipules. Flowers in simple clusters, often in corymbs, much elongated after flowering. Sepals four, free, caducous, rarely persistent, two often larger and slightly gibbous (swollen, saccate) at the base. (These two exterior sepals are opposite to the two valves of the fruit.) Petals four, free, caducous, usually equal, with a long or short claw, and an entire or notched or cleft limb. Receptacle furnished with two-four glands. Stamens six, hypogynous, unequal, the two outer ones shorter and opposite to the outer sepals; the four inner stamens longer, equal, and opposite to the two inner petals. Ovary free, with two carpels, and parietal placentas. (The two-celled fruit is formed by a prolongation of the cellular placenta.) Style simple, sometimes absent. Stigma simple or two-lobed. Fruit dry, either an elongated pod (siliqua) or short pouch (*silicula*), two-celled, many-seeded, opening by the two valves from the base to the summit; sometimes not opening, few or one-seeded, sometimes separating at transverse joints, and not opening. Seed pendulous, rarely horizontal, without albumen. Radicle approaching the hilum,



Fig. 194.—*Sinapis nigra*. 1, Branch, with cluster of flowers; 6, the pod, natural size; 9, transverse section of the seed.

lateral (accumbent), *i. e.*, applied to the edges of the cotyledons 0 = (accumbent). Radicle dorsal (applied to the back of the cotyledons) 0 ||. Radicle dorsal with the cotyledons folded on each other (conduplicate), radicle included 0 > 77. Cotyledons twice folded 0 || ||.

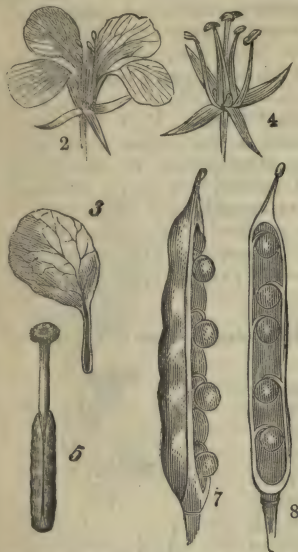


Fig. 194.—*Sinapis nigra*. 2, Flower, magnified; 3, a petal; 4, stamens, style, and sepals; 5, pistil; 7, pod, enlarged, with one valve detached; 8, the same, showing the partition (replum).

DIVISION I.—Siliquosæ. Fruit linear or lanceolate (a pod), opening, rarely not opening, many-seeded.

TRIBE I.—Cotyledons flat; radicle commissural (applied to their edges) 0 =.

Genera.—*Cheiranthus*, *Matthiola*, *Barbarea*, *Arabis*, *Dentaria*, *Cardamine*, *Nasturtium*, *Turritis*.

SYNOPSIS OF THE GENERA.

Cheiranthus. Stem half shrubby at the base, leaves attenuated below; flowers yellow, odoriferous. Stigma two-lobed; lobes curved outwardly; pod linear, nearly four-angled.

Matthiola. Stigma with two erect lobes; pod cylindrical or compressed.

Barbarea. Stigma entire or slightly notched; pod linear, cylindrical, with convex valves.

Arabis. Pod linear compressed; valves almost flat.

Dentaria. Sepals not gibbous at the base; pod lanceolate, compressed.

Cardamine. Sepals more or less spreading; pod linear, compressed.

Nasturtium. Pod cylindrical, short, passing into a silicle.

Turritis. Sepals spreading; pod linear elongated.

I. *Cheiranthus*, Linn. Wallflower. Perennial, somewhat shrubby plants. Stem leafy, branched, round or slightly angular. Leaves oblong, lanceolate, toothed or entire. Flowers odoriferous, racemose. Sepals connivent, gibbous at the base. Petals spreading, entire or slightly notched. Ovary linear, compressed, with a short style and divergent, two-lobed stigma, sometimes only slightly notched. Pod linear, dorsally compressed, mostly with an elevated longitudinal ridge on each side. Seeds compressed in a single row.

***C. Cheiri*, Linn.** Wallflower. E. B. 1934, L. C. 109. Stem woody (suffrutescent), round, branching, leafy. Leaves lanceolate, acute, entire, tapering at the base. Sepals lanceolate, blunt, at first brown, then green. Petals large, with reflexed limbs, spotted or

marked with deep or reddish brown marks on the outside, yellow within. Fruit (pods) hairy, on short erect pedicels. Perennial. March—May. Old walls.

Var. *a. fruticulosus*, Linn. Petals more or less of a deep yellow colour, not veined. On old walls. In France it grows on calcareous rocks. Perennial. April—June.

Var. *β. hortensis* (C. Cheiri, Linn.) Petals veined or striped with purple. In gardens. A variety with very narrow petals is found upon the walls of the Abbey of Bury St. Edmund's.—Mr. Babington.

A. ? C. 14. It is found between the latitude 50° and 58°, or from the British Channel to the Moray Frith, and from the Atlantic to the German or British Ocean.

II. Matthiola, Br. Stock. Herbaceous or half shrubby, usually hoary plants. Sepals and petals as in *Cheiranthus*. Style very short or absent. Lobes of the stigma converging, thickened at the back, permanent. Fruit linear compressed or nearly cylindrical. Seeds with a membranous border.

1. *M. incana*, Br. Hoary Shrubby Stock. E. B. 1935, L. C. 110. Stems erect, round, hoary, leafy, bushy, about two feet high. Leaves scattered, lanceolate, entire, hoary, rounded at the apex, tapering into a short petiole. Fruit long, cylindrical, without glands. Seeds with a white filmy border. Maritime cliffs, south of England. Perennial. June. In gardens, usually of biennial duration.

A. 2, C. 10. Lat. 50°—51°. Alt. ? T. 51°.

2. *M. sinuata*, Br. Great Sea Stock. E. B. 462, L. C. 111. Root long and tapering, whole herbage downy. Stem branched, widely spreading, two feet high, round, leafy. Leaves linear-oblong, sinuated, the lowermost with large teeth, and wide scollops. Flowers clustered, terminal, scented in the evening. Sepals densely hoary. Pods long, convex at the sides (compressed), muricated and hoary. Sea-shores, south and west of England. Biennial. June—August.

A. 3, C. 10. Lat. 50°—54°. Alt. ? T. 52°—49°.

Malcolmia maritima, Br. One of the most popular annuals about Chelsea; occurred once or twice near Battersea; and *M. littorea*, Br., a perennial species, neither known nor cultivated in any common garden, appeared for a season or two at Wandsworth steam-boat pier in profusion—another proof that all our exotics are not escapes from cultivation, as some fondly imagine.

III. Barbarea, Br. Winter Cress. Biennial or perennial, smooth plants, with upright, rather angular stems, and glabrous, shining leaves. Lower leaves lyrate, the upper pinnatifid or toothed. Flowers terminal, racemose, yellow. Calyx erect; sepals nearly equal at the base. Petals obovate, flat, with claws nearly as long as the sepals. Ovary four-angled. Style short, with an obtuse, simple stigma. Pod linear, four-angled, with convex prominently ribbed valves. Seeds in one row, slightly compressed.

1. **B. vulgaris**, Br. Common Winter Cress. E. B. 443, L. C. 95. Root vertical, tapering. Stems erect, branching above. Lower leaves lyrate, pinnatifid, with a large terminal lobe. Upper leaves obovate, toothed. Pods four-angled, short, spreading, with a long beak. Hedges, ditches, waysides. Perennial (?). April—July.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

Var. *B. arcuata*. Flowers in lax clusters; pods when young curved and spreading. Hedgebanks, &c. Biennial (?). May.

2. *B. stricta*, Andrzej. Stems erect, or somewhat curved, simple, slender, smooth, leafy. Lower leaves lyrate, *with a large, oblong-ovate, terminal lobe*, and two-three pairs of small lateral lobes; upper leaves simple, oblong-triangular toothed. Petals oblong-cuneate, considerably longer than the sepals, but not so large as in *B. vulgaris*. Pods erect, contiguous, unilateral, three times as long as the pedicels, in an elongate cluster. Between Sheffield and Halifax, and between Weedon and Blisworth. Mr. Borrer. Biennial (?). May—August.

A. ? C. ? . Lat. 52°—55°. Alt. 0—100 yards. T. 49°—47°.

3. **B. præcox**, Br. Early Winter or American Cress. E. B. 1129, L. C. 97. Stems erect, branching at the top. Lower leaves unequally pinnate, with leaflets gradually enlarging towards the apex, and with a large, roundish terminal lobe; upper leaves deeply pinnatifid, with entire linear lobes, and with a terminal linear-oblong one. Pods very long (two inches or more), with a short blunt beak in a rather diverging cluster. Sandy places. Biennial or annual (?). April, May. About Brentford, Mitcham, &c., near London.

A. 10.

This is reputed to be a famous winter salad.

IV. **Arabis**, Linn. Rock Cress. Annual or perennial plants, with leafy upright stems. Radical leaves in a rosette; stem-leaves sessile, clasping. Flowers terminal, racemose, white, rarely rosy. Calyx erect; two of the sepals somewhat protuberant at the base. Petals obovate, spreading, tapering at the base into broadish claws. Stigma entire, or scarcely notched. Pods linear, compressed, elongated, crowned with the stigma. Valves flat or nearly so, one-nerved or with several irregular very fine nerves. Seeds in a single row, pendulous, flattened-marginate.

1. **A. hirsuta**, Br. Hairy Rock Cress. E. B. 587, L. C. 92. Stems rigid, erect, usually simple, rough, with entire or branching hairs. Leaves toothed, covered with forked hairs; the root-leaves in a rosette, *the stem-leaves sagittate and clasping, more or less serrate*. Flowers small, white. Fruit (pods) erect, linear elongate. Seeds bordered, finely netted. Banks, common in chalky places. Biennial. May.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—1000 yards. T. 50°—39°.

2. **A. ciliata**, Br. Fringed Rock Cress. E. B. 1746, L. C. 91. Stems erect, tapering, furrowed, hairy, with a few leaves

on luxuriant forms, when it slightly branches. Root-leaves in a dense rosette, spatulate, entire or slightly toothed, ciliate, the upper leaves when present ovate-lanceolate, sessile; *all glabrous*. Flowers in lax panicle clusters, or in simple clusters, which are much elongated when in fruit. Fruit (pods) linear, straight, on short, erect pedicels. Rocks by the sea; Cunnamara, Ireland; Glen Esk, Scotland. Biennial. July, August. Hibernian.

3. **A. stricta**, Huds. Bristol Rock-Cress. E. B. 614, L. C. 90. Root simple, tapering, branched and tufted at the extremity. Stalks several or solitary, scarcely branched, round, tapering, hairy, two-six inches high. Leaves radical, in dense rosettes, *rough, hairy*, tapering at the base, *toothed* and *sinuate*. Stem-leaves few, smaller, toothed, and half-clasping. Flowers few, erect. Petals large, white, about twice as long as the sepals. Sepals hairy, blunt, not spreading. Fruit slender, erect, straight, on short smooth pedicels. St. Vincent's Rocks, Bristol. Perennial (?). May—August.

A. 2, C. 2. Lat. 51° — 52° . Alt. ? T. 49° — 48° .

4. **A. petraea**, Lam. *A. hispida*, Linn. Alpine Rock-Cress. E. B. 469, L. C. 89. Root long, tapering. Stems erect or ascending, simple or branched, usually smooth, four-eight inches (with a very few hairs near the base). Leaves somewhat rough, with short, spreading, forked hairs; root-leaves in lax tufts, lyrate, pinnatifid or oblong, with long stalks; *stem-leaves narrow, entire or slightly notched*. Flowers in terminal, erect, lax, corymbose clusters. Fruit somewhat spreading, slender, straight, tipped with a short beak. Seeds oblong, with a narrow margin. Alpine rocks, England and Scotland. Perennial. June.

A. 6, C. 12. Lat. 53° — 61° . Alt. 300—1400 yards. T. 44° — 33° .

5. **A. Turrita**, Linn. Tower Rock-Cress. E. B. 178, L. C. 93. Stem branching, six-fourteen inches high, with soft hairs. Leaves clasping, obovate, broad, toothed, cordate. Flowers corymbose, pale yellow. Fruit long, flat, striated, curved downwards. On walls. Scotland, Kinross-shire. Biennial. May.

Alien.

V. Dentaria, Linn. Coralwort. Stems quite simple, upright, with scaly or tooth-like horizontal fleshy rhizomes. Leaves palmate or pinnate. Flowers rosy or white. Sepals erect, equal. Ovary oblong, with a short, thick style, and obtuse, capitate stigma. Pod lanceolate, compressed; valves flat, without ribs, bursting with elasticity, mostly revolute. Seeds compressed, in one row, on dilated winged funiculi (seed-stalks).

D. bulbifera, Linn. Bulb-bearing Toothwort. Coralwort. E. B. 309, L. C. 83. Root (rhizome) thick, toothed, horizontally creeping. Stem solitary, erect, naked below, simple, furrowed, smooth. Leaves alternate, the lower ones pinnate, with five-six lanceolate or oblong-lanceolate, toothed, or laxly serrated leaflets, petiolate; the upper leaves sessile, simple (reduced to the terminal leaflet), with bulbs in their axils. Flowers large, rosy or purple, in

a corymb. Scarcely ever producing seeds, the plant propagating itself by its axillary bulbs. Moist, shady places. Perennial. May.

A. 3, C. 6. Lat. 51° — 56° . Alt. ? T. 49° — 47° .

It still grows abundantly in Old Park Wood, and in Garret Wood, both near Harefield, Middlesex.

VI. Cardamine, Linn. Bitter Cress. Annual or perennial, generally smooth, herbaceous plants. Stem and leaves variable. Flowers terminal, racemose. Calyx slightly spreading. Two of the sepals unequal at the base. Petals obovate, rather upright, tapering at the base into short claws, sometimes very small or absent. Ovary linear, slender, with an obtuse, sessile, entire stigma. Pod sessile, erect, laterally compressed, often elongated, valves flat, without ribs, opening elastically from the base. Seeds in a single row, on slender funiculi, ovate, with accumbent cotyledons.

SECT. I.—Annual or biennial plants. Petals scarcely longer than the calyx; sometimes absent.

1. **C. sylvatica**, Link. Wood Bitter Cress. L. C. 86 b. *Stems round, smooth, slender, flexuous, leafy. Leaves pinnate; lower leaves with roundish, angular, or toothed leaflets; upper leaves with narrow ones. Petals longer than the sepals, erect. Pods erect. Common in dry sandy places, in woods, &c. Annual. March—September.*

Area, &c., combined with the following, of which it is probably only a variety.

2. **C. hirsuta**, Linn. Hairy Marsh Bitter Cress. E. B. 492, L. C. 86. *Roots vertical, fibrous. Stems furrowed, angular, rough, with tubercles or hairs, somewhat zigzag. Root-leaves in a rosette. Stem-leaves alternate, all pinnate, with three-four pairs of roundish or oblong toothed leaflets. Sepals not gibbous at the base; petals small. Stamens six. Fruit nearly erect, with a very short, truncate beak. In watery places. Annual. May—September.*

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—1000 yards. T. 52° — 37° .

3. **C. impatiens**, Linn. Narrow-leaved Lady's Smock. E. B. 80, L. C. 87. *Root small, tapering. Stems solitary or several, erect, slightly branched, more or less zigzag, leafy, angular, hollow. Leaves pinnate; leaflets lanceolate, cleft or notched, lobed or toothed at the base, mostly on the lower half, and especially in the lower leaves; leaflets of the upper leaves nearly entire on the upper edge. Petioles auricled, clasping; auricles linear, acute. Flowers numerous, very small. Petals minute, very caducous. Pods erect, slender, discharging their seeds with a crackly noise. Godalming, Surrey. Biennial or annual. May, June (?).*

A. 6, C. 10. Lat. 51° — 55° . Alt. 0—100 yards. T. 48° — 46° .

Var. *Leaves and leaflets much narrower and less spreading than in the typical form, unbranched (?). Shady situations, chiefly in the north of England.*

SECT. II.—Plants perennial, with an oblique root. Petals much longer than the calyx.

4. **C. amara**, Linn. Bitter Lady's Smock. E. B. 1000, L. C.

84. Root with an *elongated*, oblique, or horizontal rhizome, usually branching. Stems erect or ascending, *angular* and *furrowed*. Leaves pinnate, with obovate, angular, toothed or *crenulate*, stalked leaflets, the terminal one the largest. Flowers large, white. Stamens almost equal to the petals. Anthers *purple*. Pods slender, spreading. Seeds ovate, yellowish-green. Riversides; not common. Perennial. May.

A. 14, C. 50. Lat. 50°—58°. Alt. 0—200 yards. T. 50°—46°.

5. **C. pratensis**, Linn. Lady's Smock. E. B. 776, L. C. 85. Root oblique or horizontal, *short*, truncate, knobby. Stems erect or slightly reclining at the base, round, quite smooth, and glossy. Leaves pinnate or pinnatifid, segments variable in shape, but mostly roundish, the terminal one the largest. Segments of the upper leaves linear and quite entire. Petals large, with dilated, obscurely-toothed, or winged claws. *Stamens only half as long as the petals*. Anthers *yellow*. Pod with a short, blunt beak. Wet meadows and watery places. Perennial. March, April.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1100 yards. T. 52°—36°.

Var. *β*. Leaflets, especially those of the lowermost leaves, acutely angled.

VII. **Nasturtium**, Br. Cress. Branching, mostly aquatic, smooth, herbaceous plants, throwing out numerous radicles, of annual, biennial, or longer duration. Stem slightly angular. Leaves pinnate or pinnatifid. Flowers racemose. Calyx spreading, equal, not protuberant at the base. Petals obovate, undivided, tapering into short claws. Style erect, short, with a blunt, slightly notched stigma. Pod short, turgid; valves without ribs or keel. Seeds rounded, in two rows, irregularly arranged.

SECT. I.—Petals white.

1. **N. officinale**, Br. Water Cress. E. B. 855, L. C. 98. Root creeping. Stem erect, succulent, branching above. Leaves pinnate, with ovate or oblong, entire or toothed segments, the terminal one roundish, large. Petals *white*, about twice as long as the calyx. Fruit linear, more or less curved, with a bent point longer than the peduncle, spreading, erect. In ditches and watery places. Perennial. June.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

Var. *siifolium*. Stem luxuriant, robust, often an inch thick, many feet long. Segments of the leaves nearly equal. The variety grows in deep water.

SECT. II.—Petals yellow.

2. **N. amphibium**, Br. *Armoracia amphibia*. *Roripa amphibia*, Bess. Great Yellow Cress. E. B. 1840, L. C. 101. Stems stout, erect, or reclining and rooting below, branching, glabrous, deeply furrowed. Leaves petioled or attenuated at the base, auricled, and partly clasping, the lower often pinnatifid, the upper toothed. Petals longer than the calyx. *Fruit roundish, oblong, on long, spreading, or*

deflexed pedicels, abruptly terminating in a slender beak. Banks of rivers. Perennial. July.

A. 12, C. 40. Lat. 50° — 56° . Alt. 0—200 yards. T. 51° — 47° .

Var. *a. indivisum*. Leaves all undivided, entire, or toothed.

Var. *B. heterophyllum*. Lower leaves pinnatifid; the upper ones entire, or rarely toothed.

Gren. and Godr. notice two varieties, viz.:—

Var. *a. longisiliquum*. Pods long, tapering at both ends, twice as long as the styles.

Var. *B. rotundisiliquum*. Pods globular, as long as the styles.

3. **N. sylvestre**, Br. *Sisymbrium sylvestre*, Linn. Wild Cress. E. B. 2324, L. C. 100. Stems reclining or prostrate, spreading, branching. Leaves pinnatifid, with usually toothed lobes, petioled; *petioles not clasping nor auricled*. Petals longer than the calyx. Fruit linear, nearly as long as the pedicel, with a cylindrical beak. Watery places. Perennial. May—August.

A. 14, C. 50. Lat. 50° — 56° . Alt. 0—200 yards. T. 51° — 47° .

4. **N. palustre**, D. C. *N. terrestre*, Sm. Land Cress. E. B. 17, L. C. 99. Stems erect, branching above. Leaves petioled, deeply pinnatifid, with oblong-lanceolate, or linear toothed, or cleft segments, rarely lyratepinnatifid. Petals longer than the calyx. Pod linear, usually curved, about as long as the pedicel, terminated by a cylindrical beak; fruit-stalks spreading or deflexed. In moist places. Annual or biennial. June.

A. 16, C. 60. Lat. 50° — 52° . Alt. 0—700 yards. T. 51° — 47° .

VIII. **Turritis**, Linn. Tower Mustard. Upright biennial plants, with round, leafy stems. Leaves entire, clasping the stem. Flowers white, in terminal racemes. Sepals oblong, diverging, two slightly protuberant at the base. Petals obovate, erect, entire. Ovary linear. Style very short, with an obtuse simple stigma. Pod linear, compressed, very long and slender, two-edged. Valves straight, flat, with a prominent nerve. Seeds numerous, in two rows.

T. glabra, Linn. Smooth Tower Mustard. E. B. 777, L. C. 94. Stems erect, rigid, simple, slightly hairy at the base, glabrous and glaucous above. Root-leaves in a rosette, hairy, decaying before the production of the fruit; the upper leaves glabrous and glaucous. Fruit very long, pressed close to the stem, quite smooth, five-six times as long as the pedicels. Dry places about hedges and fields. Biennial. June, July.

A. 10, C. 30. Lat. 50° — 56° . Alt. 0—200 yards. T. 50° — 47° .

TRIBE II.—Cotyledons flat, radicle on the back of one of them. (Radicle dorsal 0 ||.)

Genera.—*Hesperis*, *Erysimum*, *Sisymbrium*.

SYNOPSIS OF THE GENERA.

Hesperis. Stigma two-lobed; lobes erect, connivent. Fruit cylindrical.

Erysimum. Stigma entire, or lobed. Fruit linear, angular.

Sisymbrium. Stigma entire or notched. Fruit linear, with convex valves.

IX. Hesperis, Linn. Dame's-Violet. Stem erect, branching. Leaves ovate-lanceolate, toothed. Flowers terminal, racemose, odorous, especially in the evening. Sepals converging, obtuse, two lateral gibbous at the base. Petals clawed, slightly notched, spreading obliquely. Ovary four-angled; stigma nearly sessile, two-lobed, downy. Pod linear, more or less four-angled, striated. Valves linear, undulated, acute. Seeds in one row, pendulous.

H. matronalis, Linn. Dame's-Violet. E. B. 731, L. C. 112. Stems several, erect, round, hairy, leafy. Leaves petioled, oblong-elliptical, tapering at both ends, pointed, hairy, shining, laxly toothed; teeth small. Flowers white, with a reddish violet tinge, in lax, terminal, or axillary clusters. Calyx erect; sepals unequal at the base, obtuse. Petals with a broad, spreading, flat limb and long claw, with two small teeth, one on each side. Fruit *torulose*, nearly erect, on short, spreading, upwardly-curved pedicels. ~~In several places, but scarcely naturalized.~~ Perennial. June. *Roots of Moncreiffe & Kennel abundant where it is certainly wild John Sm*

X. Erysimum, Linn. Treacle Mustard. Biennial plants, rarely annual or perennial in duration. Stems erect, branched. Leaves simple, often lanceolate, and almost entire. Flowers racemose. Pods in long, upright clusters. Calyx erect. Sepals nearly equal. Petals flat, with erect claws. The two shorter stamens are accompanied with a gland. Style very short; stigma notched or obtuse. Pod four-angled; valves keeled, rectangular. Seeds in one row.

SECT. I.—Plants with starry pubescence. Stem-leaves nearly sessile. Flowers yellow.

1. **E. Cheiranthoides**, Linn. Treacle Mustard. E. B. 942, L. C. 106. Stem rigid, rough, erect, branching above, angular. Leaves roughish, oblong-lanceolate, narrowed at both ends, laxly toothed, rarely entire. Pedicels spreading, *shorter than the pods*. Claw of the petals scarcely longer than the calyx. Fruit green, quadrangular, with acute angles, slightly downy. Stigma entire. Moist fields. Annual. July.

A. 4, C. 10. Lat. 50°—53°. Alt. 0—100 (200) yards. T. 51°—48°. Fields on the Clent Hills, 200 yards high at least.

SECT. II.—Plants glabrous-glaucous. Stem-leaves cordate, clasping. Flowers pale yellow, white.

2. **E. orientale**, Br. Hare's-ear Treacle Mustard. E. B. 1804. L. C. 15. Stems simple, branching above. Leaves entire, glaucous; root-leaves obovate; stem-leaves ovate-oblong, cordate and clasping at the base. Limb of the petals narrow, *tapering gradually* into a long claw. Fruit on short pedicels, spreading, long, with prominent angles; stigma entire. Near the sea; in fields and on cliffs. Wandsworth steam-boat pier, plentiful for several years. Annual. June.

XI. *Sisymbrium*, Linn. in part. Hedge Mustard. Hairy or downy plants. Flowers yellow or white. Sepals slightly spreading or nearly erect, equal. Fruit (silique, pod) linear cylindrical; valves convex, with three longitudinal nerves, and sometimes obscure lateral nerves. Seeds in one row, oval or oblong.

SECT. I.—Flowers white. Leaves not divided.

1. ***S. Alliaria*, Scop. *Alliaria officinalis*, D.C. Hedge Garlic.** E. B. 796. *Erysimum Alliaria*, L. C. 107. Stems usually solitary, erect, simple, or branching above, hairy below. Leaves petioled, glabrous, the lower ones on long stalks, *reniform-cordate*, the upper ovate-cordate, all with large unequal teeth. Pods spreading, many times longer than the pedicel. Seed oblong, truncate obliquely at both ends, striated longitudinally. Hedges; common. Biennial. May.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

2. ***S. thalianum*, Gay. *Arabis thaliana*, Linn. Wall Cress.** E. B. 901, L. C. 88. Stems several or solitary, erect, simple or branching, slender, downy below, glabrous above. Leaves mostly radical, in a rosette, oblong, laxly-toothed, tapering into petioles, hairy; stem-leaves *oblong, entire, sessile*. Pods spreading-ascending, cylindrical, longer than the pedicels. Seeds small, ovate-roundish, not striated. Sandy fields, banks and walls. Annual. April—June.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—300 yards. T. 51°—45°.

SECT. II.—Flowers yellow. Leaves more or less divided.

3. ***S. officinale*, Scop. Officinal Hedge Mustard.** E. B. 735, L. C. 102. Root very long, hard, tapering. Stem erect, rigid, with numerous spreading branches, or branched from the base; hairs rough, spreading or deflexed. Leaves petioled, hairy, the radical and lower stem-leaves *runcinate-pinnatifid*, with numerous oblong, angular, unequally toothed lobes, the terminal one the largest; upper leaves *hastate, with elongated terminal narrow lobes* and narrow lateral ones. Petals longer than the sepals. Fruit hairy or downy, closely appressed to the stem, *oblong-conical, tapering to a slender point on a short stout pedicel*. Hedges, roadsides; common. Annual. May.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

4. ***S. Irio*, Linn. London Rocket.** Not the London Rocket of gardeners, which is some species or variety of *Hesperis*. E. B. 1631, L. C. 103. Stems erect or reclining at the base, simple, branching above, round, glabrous, or slightly downy, leafy. Leaves glabrous or nearly so; root-leaves *runcinate, pinnatifid, or pinnate*, with oblong, unequal, toothed lobes, upper leaves somewhat *hastate*, with elongated, narrow, lanceolate, entire or toothed lobes, terminal leaflet oblong lanceolate, entire or sinuate. Petals longer than the calyx. Fruit glabrous, *spreading, ascending, linear, slender*, much longer than the pedicel, with a very short point. Rubbish about towns. Annual. June.

Has this plant been seen recently about London?

A. 3, C. 7. Lat. 51°—56°. Alt. 0—50 yards. T. 49°—48°.

5. *S. Sophia*, Linn. Flix-weed. E. B. 963, L. C. 104. Stems erect, round, tapering, with soft, downy hairs, branching; branches somewhat spreading. *Leaves bi-tripinnate, with narrow, linear, entire or incised segments*, clothed with soft hairs. Petals shorter than the calyx or absent. Fruit glabrous, spreading-ascending, linear, slender, twice as long as the pedicel, with a very short beak. Fields and waste places. Not common. Annual. June.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

6. *S. polyceratum*, Linn. Many-podded Hedge Mustard. Rchb. 4403, L. C. 105. Stem round, downy, furrowed, very leafy and much branched. *Leaves lyrate-pinnatifid, with triangular hastate terminal lobes*. Flowers in pairs or in threes, very small. Pods numerous, several together, sessile, or nearly so, roundish, subulate, spreading, or partly encircling the stem, usually incurved, slightly hairy. Bury, Suffolk. Apparently naturalized.

Alien.

S. austriacum (?), Jacq. Rchb. Ic. Fl. Ger., ii. 77. Stems erect, slender, rigid, hairy. Lower leaves lyrate-runcinate, with toothed lobes, the terminal lobe hastate. Upper leaves lyrate or hastate or linear-lanceolate. Flowers rather large. Pedicels spreading-erect. Sepals yellowish. Pods cylindrical, hairy. Wandsworth steam-boat pier. Annual. July.

S. pannonicum, Jacq. Ic. 123. Rchb. Ic. Fl. Ger., ii. 74. Stems erect, straight, cylindrical, shining, with a few, long, scattered hairs, leafy. Lower leaves runcinate-pinnatifid, with triangular toothed lobes, hairy, petiolate; stem-leaves (upper leaves) pinnate, with linear-cylindrical leaflets. Pedicels not longer than the calyx. Sepals spreading. Petals about twice the length of the calyx. Pods spreading, very long, cylindrical, furrowed (?), glabrous, with a few long hairs and a thick, spongy dissepiment. With the above. Annual or biennial. June—August.

S. Columnæ, Jacq. Fl. Aust., iv. 323. Rchb. Ic. Fl. Ger., ii. 75. Stems erect, rigid, glabrous, with a few scattered hairs, leafy. Root-leaves runcinate, each lobe with a basal ascending tooth, the lobes are all triangular elongate and toothed, upper leaves pinnate, with linear, channelled, fleshy lobes, clusters lax. Pedicels stout, rather longer than the sepals, spreading, ascending. Pods three-four inches long, arcuate ascending, or nearly erect, hairy, crowned with the two-lobed stigma. Seeds finely punctate, cylindrical. These exotics have grown at Wandsworth steam-boat pier plentifully (especially the last) during the preceding five or six years. They seem quite at home, and will probably outlast the home itself, which is gradually becoming a commercial rather than a botanical locale.

TRIBE III.—Cotyledons conduplicate. The folded cotyledons embrace the radicle which lies on their back (radicle included) 0 77.

Genera.—*Brassica*, *Sinapis*, *Eruca*, *Diplotaxis*.

SYNOPSIS OF THE GENERA.

Brassica. Root-leaves commonly lyrate or pinnatifid petiolate. Flowers yellow or white, sometimes veined. Pod linear-roundish, with convex valves and cylindrical beak (style).

Sinapis. Pod linear or oblong, roundish, with a more or less compressed angular beak.

Eruca. Flowers white, with violet veins. Pod oblong-roundish. Valves convex, keeled.

Diplotaxis. Leaves petiolate, flowers yellow, sepals slightly spreading, not gibbous at the base; pod linear, compressed.

XII. *Brassica*, Linn. Cabbage, Colewort, &c. Annual or biennial herbaceous plants, with succulent erect stems and glaucous leaves. Sepals erect or spreading, linear, coloured, the two outer slightly gibbous at the base. Fruit linear, nearly cylindrical. Valves convex, with one straight, longitudinal nerve; lateral nerves wavy, indistinct or none; beak conical. Seeds in one row, round.

1. ***B. oleracea*, Linn.** Sea Cabbage. E. B. 637, L. C. 113. Stem woody, cylindrical, leafy only about the top. Flower-stems long, succulent. Leaves fleshy, glaucous, glabrous, lyrate, waved, sinuate, toothed. Flowers deep yellow, in long clusters. Sepals erect, close at the base. Petals with thick, fleshy, winged claws and prominent branching and anastomosing nerves. Fruit *cylindrical*, smooth, veined with a short beak, crowned with the round stigma. Seeds large, roundish. Sea-cliffs, Dover, and many other parts of the coast. The origin of the Garden Cabbage (?). Biennial. July.

A. 5, C. 10. Lat. 50°—54°. Alt. ? T. 52°—49°.

2. ***B. campestris*, Linn.** Common Wild Navew, Turnip. E. B. 2234, L. C. 114. Root tapering; stem two feet high, branched, leafy, glaucous. Root-leaves lyrate, *rough*. Stem-leaves glaucous, smooth. Flowers large. Pods (fruit) stalked, ascending, smooth, stout, angular, cylindrical, *beak one-third of an inch long*. Seeds brown. Corn-fields and ditch-banks. Annual. June, July.

Note.—This and the two following are probably varieties of one species.

A. 14, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

3. ***B. Rapa*, Linn.** Common Turnip. E. B. 2176, L. C. 114*. Root fleshy. Root-leaves lyrate, *rough*; stem-leaves smooth. Fields. Biennial. April, May.

A. 14, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 51—47°.

4. ***B. Napus*, Linn.** Rape or Cole-seed. E. B. 2146, L. C. 115. Stems erect, fleshy, angular, branched, leafy. Leaves smooth, glaucous; root-leaves, which disappear before flowering, lyrate; stem-leaves sessile, clasping, cordate at the base, lanceolate, toothed, or entire. Sepals erect, open only above, linear-lanceolate, slightly coloured. Petals smaller, with branching, *straight, not reticulating nerves, and slender, not winged claws*. Fruit on slender, spreading

stalks, turgid,* with long, cylindrical beaks. Ditch-banks, fields, and waste ground. Biennial. June.

A. 18, C. 70. Lat. 50°—59°. Alt. 0—200 yards. T. 51°—46°

Note.—Gr. and Godr., Fl. de Fr., 76, only recognise three of our British *Brassicas*, viz., *B. oleracea*, as an escape from cultivation, not *wild*, as British botanists always describe it, and call it the parent of the cultivated varieties on very slender evidence; *B. Napus*, including the oil-producing (*colza*) plant and the common esculent; and *B. asperifolia*, including *B. Rapa*, Koch, and *B. campestris*, Linn.

XIII. Sinapis, Linn. in part. Mustard. More or less hairy plants. Leaves lyrate or pinnatifid. Flowers yellow; sepals spreading, rarely erect, equal. Fruit (silique, pod) linear or oblong, nearly cylindrical, with convex valves, which are furnished with three-five longitudinal, straight, prominent nerves. Beak long, more or less compressed; often bearing a seed at its base. Seeds in one row, almost round.

1. **S. arvensis**, Linn. Wild Mustard. Charlock. E. B. 1748, L. C. 116. Stem branching, hispid, with strong, often reflexed hairs. Leaves ovate or oblong, the lower ones lyrate or irregularly sinuate, the upper unequally sinuated or toothed, sessile, or nearly so. Sepals spreading horizontally. Fruit *more or less spreading*, usually glabrous. Valves thick, with intermediate nerves longer than the beak. Beak conical compressed. Seeds black, smooth. Fields common. Annual. May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—43°.

Var. *glabra*. Stem and leaves quite glabrous; fruit cylindrical, torulose, with an angular beak, prominently nerved. Seeds ovate, finely shagreened in two rows. Beak without seeds. Common about Chelsea, Battersea, and Kew.

There is another variety with pods, not angular like the above, but very turgid and compressed; beak tapering, round. Seeds rather more globular than in the preceding, and more decidedly two-rowed.

These varieties in aspect and characters approach the genus *Brassica*. Are the genera *Sinapis* and *Brassica* well distinguished?

2. **S. alba**, Linn. White Mustard. E. B. 1677. L. C. 117. Stems erect, branched, glabrous (sometimes hispid). Leaves *all lyrate, pinnatifid*, glabrous (or hispid), with unequally sinuated or toothed lobes. Sepals spreading. Pods *hairy* (hispid), with two-three seeds; valves shorter than the *flattened ensiform* beak (sword-shaped beak), spreading. Seeds yellowish, finely punctate, not numerous. Fields and waste places. Annual. June—August.

A. 18, C. 60. Lat. 50°—59°. Alt. 0—200 yards. T. 51°—46°.

Var. Stem and leaves as in the common form (?). Sepals spread-

* The following distinctive marks are said to be derivable from the pod:—In *B. campestris* the pod is stout and angular; in *B. Napus* it is torulose (beaded); and in *B. Rapa* shorter and not so much beaded. Will any botanist *endorse* these characteristic notes?

ing, partly glabrous. Petals more than twice the length of the sepals. Style flat, not so long as the pod in the matured specimen. Pod twice as long as in *S. alba*, and not half so thick, hairy or bristly, as well as the beak. Seeds *ovate*, small.

At Wandsworth steam-boat pier a sub-variety of this, with the pods not so hairy, and one with the pods quite glabrous, are found.

3. *S. dissecta*, Lag. Hort. Madr. Mor. Fl. Sar. 12. This species may perhaps have been confounded with *S. alba*, from which it is sufficiently distinct. Stems erect, branched and bushy, glabrous, or only with a few spreading hairs. Leaves pinnate or pinnatifid, with oblong, pinnatifid, or toothed segments, glabrous, fleshy. Flowers smaller than in *S. alba*. Sepals spreading, shorter than the peduncles (pedicels). Pods *short, smooth, ovate* or *oblong*, spreading, ascending with a very long, flat, attenuated beak, which is glabrous, except a few marginal fringes. This is readily distinguished from *S. alba* by its smaller flowers, and especially by its glabrous, few-seeded pods, as well as by its pinnatifid leaves. The whole herbage is glabrous and fleshy. Abundant in 1855, on mud spread out on Battersea Fields (Park), with several exotics, but where it has since disappeared. Annual. May—June.

4. *S. monensis*, Bab. *Brassica monensis*, Huds. Isle of Man Cabbage. E. B. 962, L. C. 122. Root tapering, woody. Stem solitary, or several from the same root, slightly branched, round, glabrous, or somewhat bristly, or smooth, leafy. Leaves mostly radical, deeply pinnatifid, with toothed or jagged linear lobes; in the upper leaves (when present) *the lobes are linear and almost entire*. Sepals converging. Pods almost erect (slightly spreading), on short pedicels, large, smooth, veiny, *quadrangular*. Beak about one-third as long as the pod, tapering, ribbed, containing one-three seeds. Isle of Man, and Lancashire and Cheshire coasts. Perennial (biennial?). June—July.

It has been gathered, with many exotic *Crucifers*, at Wandsworth steam-boat pier. Is this species unknown on the Continent, or is it included in the following?

A. 6, C. 12. Lat. 51°—57°. Alt. ? T. 50°—48°.

5. *S. Cheiranthus*, Koch. Wallflower-like Sinapis. E. B. 1821, L. C. 122. Stem erect, glaucous, branching above, rough, with long, distant, spreading hairs. Leaves all pinnatifid, lobes unequally toothed; upper leaves with linear, entire lobes. *Sepals erect, close to the petals*, rather longer than the pedicels, slightly unequal. Petals large, yellow. Fruit (pods) glabrous, spreading; valves with three dorsal nerves and anastomosing veins. Seeds numerous, black, finely punctate; the beak is one-three-seeded. Merthyr-Tydvil, South Wales; Channel Isles. Biennial or perennial. May—August.

A. (6).

A stray plant was gathered at Chelsea in 1852, probably introduced with coals or iron from South Wales.

Gren. and Godr., "Fl. de France," under *S. Cheiranthus*, describe three varieties, viz. :—

Var. *a. genuina*, Gren. and Godr. Stem solitary, rather leafy; leaves with obtuse lobes; flowers large.

Var. *β. cheiranthiflora*, Gren. and Godr. Stems slender, with few leaves; lobes of the leaves acute; flowers small.

Var. *γ. montana*, D. C. Stems short, numerous, not leafy; flowers deep yellow. Annual or biennial. June—August.

The first variety agrees better with our *S. Cheiranthus* than the second, which may be our *S. monensis*, or some form of it. The var. *γ. montana* is probably unknown as a British plant.

6. *S. nigra*, Linn. Black Mustard. E. B. 969, L. C. 118. Stems stout, branching, hairy, hispid, especially below. Leaves petiolate, lyrate-pinnatifid; the lower ones hispid, the upper usually glabrous-lanceolate, entire, or sinuated. Sepals spreading. Fruit erect, *more or less curved about the stem*, and contiguous and pressed to it, oblong, linear, smooth; *valves keeled by the prominent dorsal nerve*. Beak four-angled, bearing one or two seeds. Fields. Annual. June.

A. 14, C. 50. Lat. 51°—56°. Alt. 0—100 yards. T. 52°—48°.

7. *S. incana*, Linn. *Erucastrum incanum*, Koch, E. B. 2843, and *Hirschfeldia adpressa*, Moench. Hoary Eruca. Stems round, tapering, rigid, hairy or bristly-warty; branches spreading. Lower leaves lyrate, upper ones oblong-linear, toothed, on tapering petioles. Flowers in clusters, on short pedicels; clusters *very much elongated in fruit*. Sepals lax, hairy, linear. Petals yellow, with longish claws, twice as long as the calyx. Fruit appressed, *with a very large unilateral beak*. The habit of the whole plant and the disposition of the fruit resemble *Sisymbrium officinale*. Jersey. Biennial. June. Steam-boat pier, Wandsworth. Very few examples.

XIV. **Eruca**, D. C. Annual or biennial plants, with lyrate or pinnatifid leaves and white flowers, veined with violet. Sepals erect, not gibbous at the base, closely applied. Pod oblong, nearly cylindrical, hairy, with convex, keeled valves, and a single prominent nerve. Beak compressed, ensiform, smooth, without a seed at its base.

E. sativa, Lam. Stem spreading, much branched, smooth. Leaves slightly fleshy, smooth, lyrate-pinnatifid; the upper narrow, oblong, and toothed. Claws of the petals very long. Pods erect, not closely applied to the stem, hairy or glabrous (we have only noticed hairy pods). The pods are usually spinous; the beak large, flattened and smooth, except on the margin, which has spinous fringes, compressed. Fields and waste places on the Continent. Annual. June—September.

Very abundant at Wandsworth steam-boat pier for several years.

XV. **Diplotaxis**, D. C. Wall Mustard. Annual or biennial, rarely perennial, plants. Stems erect, branching. Leaves sinuate, toothed, pinnatifid, petiolate, often fleshy. Flowers yellow, in long racemes, or filiform pedicels. Calyx lax, equal at the base. Petals

entire. Stigma discoid. Pod *linear*, elongated, *compressed*, four-angled; valves convex, one-nerved. Seeds many, ovate, compressed, pendulous in two rows, rarely in one row by abortion.

1. **D. tenuifolia**, D. C. Slender-leaved Wall Mustard. E. B. 525, L. C. 120. Root perennial, *woody*. Stems ascending or erect, somewhat woody at the base, leafy, branching, glabrous or nearly so, glaucous. Leaves glabrous, glaucous, somewhat fleshy, the lower ones pinnatifid, with entire or slightly toothed lobes; the upper leaves sinuate-toothed, or almost entire. Pedicels *elongated after flowering*, spreading. Flowers large. Calyx spreading, *glabrous*. Petals *much larger* than the calyx, obovate or roundish, *with a short narrow claw*. Pods about as long as the pedicels. Rubbish about towns. Perennial. June.

Note.—It frequently grows on old walls at Southampton, Chester, &c. In such localities the plant is smaller, and the leaves are entire, with a rigid habit, like the common Wall-flower.

2. **D. muralis**, D. C. Sand Mustard. E. B. 1090, L. C. 121. Stems ascending or erect, often simple, or several from one root, rough, with deflexed, bristly, white hairs, round. Leaves mostly radical, oblong, toothed or *pinnatifid*, almost glabrous, tapering at the base into winged petioles. Pedicels *spreading*, the lowermost long, the others gradually decreasing. Calyx *rough, with stout bristles*. Petals *longer* than the calyx, with a rounded limb and short claw. Fruit distant, spreading, linear, narrowed at both ends, compressed, with a short beak. Dry banks and old walls. Biennial or perennial (?). June.

In the valley of the Thames generally, from the Isle of Thanet to the upper part of the river. Very plentiful about Battersea, Kew, &c.

Diploxaxis erucoides, D. C. Stem herbaceous, erect, leafy. Root-leaves lyrate; stem-leaves pinnatifid, with short blunt lobes. Flowers large, white, veined with violet veins. Sepals spreading a little longer than the peduncle. Fruit beaked, with a single seed at its base. Very plentiful near the steam-boat pier, Wandsworth. Annual. July.

DIVISION II.—**Siliculosæ**. Fruit oval, oblong or nearly round, opening; *rarely* not opening, one-four- or many-seeded.

TRIBE I.—Fruit (silicle, pouch) opening. Seeds not adhering to the valves.

SUB-TRIBE I.—Fruit compressed, parallel to the partition; partition equal to the larger transverse diameter of the pouch (fruit). Valves nearly flat or convex, never boat-shaped.

Genera.—*Alyssum*, *Königa*, *Draba*, *Cochlearia*, *Armoracia*, *Camelina*, *Vella*.

SYNOPSIS OF THE GENERA.

Alyssum. Leaves entire. Flowers yellow or yellowish. Pouch ovate or roundish, with convex valves.

Königa. Pouch ovate, with flat valves.

Draba. Flowers minute, white. Pouch oblong, entire at the apex, crowned with the persistent, nearly sessile style.

Cochlearia. Leaves entire, or toothed, or incised. Flowers white. Pouch roundish or oblong, with very convex nerved valves.

A Armoracia. Distinct from the last by its large petiolate leaves. Pouch round, valves not nerved.

Camelina. Stem-leaves clasping. Pouch obovate, pear-shaped, slightly compressed.

Vella. Leaves pinnatifid. Pouch with a broad, flat, leaf-like appendage (style?).

XVI. Alyssum, Linn. Alyssum (Alyson). Small herbaceous or shrubby plants, of annual or biennial duration. Stems branching. Leaves mostly narrow and entire; whole plant downy or hoary. Calyx *persistent*, cup-shaped; sepals ovate, uniform, erect. Petals obovate, spreading, with short claws. Stamens toothed or glandular at the base. Silicle roundish or ovate, with flattish valves or convex in the centre, one-three-celled. Seeds ovate, one or two in each cell, compressed.

1. **A. calcycinum**, Linn. Rigid Alyssum. E. B. 2853, L. C. 82. Stems several from a long, tapering, woody root, branched above, erect. Lower leaves obovate; upper oblong. Flowers *at first yellow, afterwards white*. Calyx more or less persistent. Petals about as large as the sepals, slightly notched. Lateral stamens each with a subulate tooth. Fruit roundish, slightly notched, with an incurved rim, and covered with more or less spreading hairs, crowned by the remains of the style. Grassy commons, Scotland. Annual. May, June. *Sandy Links Montrose John Sm.*

A. 7, C. ? Lat. 50°—56°. Alt. ? T. ?

XVII. Königa, Br. Königa. Annual or perennial plants, with nearly linear, quite entire leaves. Flowers white, in terminal racemes. Calyx spreading, nearly equal at the base. Petals spreading, clawed, with an entire limb. Pouch nearly ovate, with flat valves. Seeds several or solitary by abortion.

K. maritima, Br. *Alyssum*, Sm. Sweet Alyssum. E. B. 1729, L. C. 81. Roots annual. Stems several, procumbent, leafy, branching, slightly hairy, rather woody. Leaves oblong-linear, pointed, tapering at the base. Flowers white, odorous, in long clusters. Pedicels of the fruit spreading, half an inch long; fruit ascending, ovate, nearly glabrous, crowned by the stout persistent style. Naturalized in several places, and especially near the sea. Perennial(?). August, September. Annual, in gardens. *Near Aberdeen*

A. 7, C. ? Lat. 50°—57°.

XVIII. Draba, Linn. Whitlow-grass. Annual and perennial plants, usually with rosaceous tufts of root-leaves, which are entire or toothed, and more or less hairy. Flowers very small, usually white. Sepals slightly spreading. Pouch oblong, entire at the apex,

crowned by the persistent stigma, compressed; valves flat, or slightly convex; cells many-seeded. Seeds compressed in two rows.

1. **D. verna**, Linn. Common Whitlow-grass. E. B. 586, L. C. 79. Root *annual*, fibrous. Stems several, slender, erect, or slightly bent, naked, *quite smooth*, leafless. Leaves all radical in a rosette, oblong pointed or oboval, entire or notched at the summit, furnished with both simple and forked hairs. Flowers very small, in a corymbose cluster; petals *white*, deeply cleft, longer than the calyx. Fruit on long pedicels, smooth and veiny. On old walls, sandy soil, &c. Annual. March.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—800 yards. T. 52°—39°.

Var. **β. inflata**. Pouch turgid. This we have seen near Settle, in September, and we have a specimen from Ben Lawers.

Var. Stem hairy. Leaves spatulate, not rounded, in a dense rosette. Pedicels long, spreading, or reflexed. Calyx hairy. Pouch quite smooth, elliptical, tapering at both ends.

2. **D. aizoides**, Linn. Yellow Alpine Whitlow-grass. E. B. 1271, L. C. 75. Root *perennial*. Stems numerous, branched near the root; *barren ones short, with a tuft of leaves*; fertile ones very slender, *rough*, simple, with a few bright *yellow clustered flowers*. Leaves very numerous, imbricated, rigid, *linear* or lanceolate, ciliated, keeled. Petals twice as long as the calyx, slightly notched. Fruit elliptical, with a short blunt beak. Seeds ovate, elongate. On rocks (?) and walls. South Wales (Pennard Castle, near Swansea). Perennial. April.

A. 1, C. 1. Lat. 51°—52°. Alt. ? T. 50°—?

3. **D. rupestris**, Br. Rock Whitlow-grass. E. B. 1338, L. C. 76. Stems numerous, very slender, *each bearing a dense rosette of leaves*, and one-three peduncles. Leaves small, elliptical-lanceolate, ciliated at the margins in dense rosettes about half-way up the stem. Flowers small, in lax, terminal clusters. Petals twice as long as the sepals, with a notched limb. Fruit oblong, slightly hairy, *somewhat twisted*, with a stout cylindrical rounded beak. On alpine rocks. Perennial. July.

A. 2, C. 3. Lat. 56°—59°. Alt. 900—1300 yards. T. 36°—34°.

4. **D. incana**, Linn. Whitlow-grass. E. B. 388, L. C. 77. Stems erect, four-sixteen inches high, *densely hairy*, with spreading hairs, simple or branching, leafy. Leaves sessile, lanceolate; root-leaves in dense rosettes; stem-leaves *scattered*, sessile, with erect teeth. Sepals blunt, hairy. Petals twice as long as the calyx, notched. Fruit *ovate-lanceolate, slightly twisted, twice as long as the pedicel*. Mountainous rocks. Annual. July.

A. 9, C. 15. Lat. 53°—61°. Alt. 0—1100 yards. T. 46°—36°.

This species varies from three-four inches to two feet long. In luxuriant specimens the clusters are paniced, on branches more or less divergent all the way up the stem. In smaller forms the clusters are quite simple.

5. **D. muralis**, Br. Wall Whitlow-grass. E. B. 912, L. C. 78. Stem erect, branched, round, rough, leafy. Root-leaves obovate, tapering at the base, in a lax rosette, entire or toothed. Stem-leaves

ovate, elliptical, toothed, with *two rounded auricles*. Flowers numerous, small, white, terminating the stem and branches in a dense cluster, axis subsequently elongated, with numerous spreading hairy pedicels. Calyx hairy. Petals notched or incised. Fruit (pouch) about half the length of its stalk, *elliptical even*, smooth, six-eight seeds in each cell. Rocky calcareous places, West Yorkshire, &c. Annual. May, June.

A. 6, C. 6. Lat. 51°—55°. Alt. 0—300 yards. T. 48°—45°.

XIX. Cochlearia, Linn. Scurvy-grass. Annual or perennial, smooth, rather succulent herbaceous plants, with branched spreading stems, and simple, mostly entire leaves and white flowers. Calyx lax, spreading; sepals ovate, equal at the base. Petals spreading, with short claws quite entire. Silicle globose, ovate or elliptical, turgid, rugged, tipped with the style, two-celled; valves thick, scarcely keeled. Seeds in two rows, several in each cell.

1. **C. officinalis**, Linn. Common Scurvy-grass. E. B. 551, L. C. 72. Stems erect, branched, angular, succulent, smooth. Root-leaves *roundish* (cordate-reniform), on long stalks. Stem-leaves on short stalks or sessile; all fleshy and entire or toothed, smooth, shining, upper leaves clasping, auricled, toothed, angular. Calyx spreading or open; sepals with broad scarious margins. Petals *large, white*. Fruit (pouch) round (globular or obovate), smooth. Biennial (?). Sea-coast, or on the banks and channels of mountain streams. May—August.

A. 18, C. 50. Lat. 50°—61°. Alt. ? T. 52°—46°.

C. alpina, L. C. 72 b. Root-leaves entire, stem-leaves lobed; fruit and flowers as in *C. officinalis*. On lofty hills, between Malham and Settle, Yorkshire. Ben Lawers.

2. **C. danica**, Linn. Danish Scurvy-grass. E. B. 696, L. C. 72 c. Stems procumbent, branching at the base, spreading. Leaves *cordate lobed* (deltoid), all petioled, except the very uppermost (the stalks gradually shortening upwards). Flowers *pinkish, smaller, and less spreading than in C. officinalis*. Fruit (pouch) ovate, *in much longer clusters* than in the above. Sea-coast. Annual. May—August.

A. 15, C. 40. Lat. 50°—61°. Alt. ?

Smith says it is unchanged in cultivation; this we can confirm. Whether it and the following be distinct from the preceding is not yet so certain.

3. **C. anglica**, Linn. English Scurvy-grass. E. B. 552, L. C. 72 d. Stem deeply furrowed or winged, branching. Root-leaves tapering into a long petiole, oblong, lobed or toothed. Stem-leaves sessile or amplexicaule, toothed. Flowers in terminal clusters; calyx spreading; sepals fleshy, with a scarious border. Petals ovate, blunt, with a more or less oblique short claw. Fruit *twice as large as in C. officinalis*, *turgid*, roundish, notched, crowned with the style. Seeds large brown, muricated. Muddy places by the sea, and on the banks of tidal rivers. Annual. July.

A. 14, C. 30. Lat. 50°—58°. Alt. ? T. 52°—47°.

XX. *Armoracia*, Fl. Wett. *Roripa*, Besser. Root fleshy, conical, deeply fixed in the soil, of a very acrid flavour. Stems erect, rigid. Leaves simple. Sepals equal. Petals more than twice the length of sepals. Fruit roundish, with very convex *nerveless* valves. Seeds numerous.

Note.—This genus differs but slightly from *Cochlearia*.

A. *rusticana*, Fl. Wett. Horse-radish. E. B. 2323, L. C. 73. Stems a yard high or more, robust, branching above, glabrous. Root-leaves on long petioles, ovate-oblong, crenulate; stem-leaves lanceolate entire or serrated, the lower ones sometimes pinnatifid. Flowers white, clustered, clusters in terminal panicles. Fruit on longish pedicels. Valves not nerved. Commonly cultivated, and occasionally wild about riversides, but more common on rubbish and waste places; near villages. Perennial. June.

Besser includes *Nasturtium amphibium* with *A. rusticana* in his genus *Roripa*.

XXI. *Camelina*, Crantz. Gold of Pleasure. Annuals, with slender, erect, mostly simple stems. Stem-leaves sagittate, clasping, entire, toothed, or cleft. Flowers yellow. Sepals erect, equal. Petals small, with ovate limb and long claw. Fruit *obovate, pear-shaped*, slightly winged. Valves turgid. Style about half as long as the pouch. Seeds several in each cell, ovate, scarcely compressed, finely punctate.

C. *sativa*, Crantz. E. B. 1254, L. C. 80. Stems erect, simple, rigid, more or less downy. Leaves (lower) oblong, narrowed at the base. Stem-leaves lanceolate, upper ones linear, clasping, and arrow-shaped at the base, all toothed and glabrous or slightly downy. Fruit (pouches) large, with a long beak, on long, spreading, or deflexed stalks. Among flax. Not naturalized. Fields. Annual. June.

This plant is an introduced species. *C. dentata* may be a synonym of *C. sativa*, in which the leaves are sometimes entire and sometimes toothed.

A. 15, C. ? Lat. 50°—58°.

Var. *α. pubescens*. Whole plant hairy, especially the lower part of the stem.

Var. *β. glabrescens*. Plant glabrous, or only with a few scattered hairs. Pouches yellowish-green. This form is much taller than *pubescens*, which has been noticed only at Wandsworth steam-boat pier, associated with many exotics.

Neslia paniculata, Desv., has been collected during several years in the vicinity of Chelsea and Battersea, and especially near the steam-boat pier, Wandsworth. It may be readily distinguished from the genera and species in this section by its rounded, bony, wrinkled pouches, which are in lax paniced clusters. The stem is quite erect, usually simple, rough and hairy. Leaves oblong-linear or lanceolate-clasping, toothed, more or less rough. Annual. June—August.

XXII. *Vella*, Linn. Cress-rocket. Herbaceous or half-shrubby plants, with small yellow flowers. Calyx erect, sepals equal. Petals small, obovate, with claws as long as the sepals. Fruit cylindrical-ovate, ribbed, hairy, crowned by the much-dilated, concave, ovate, pointed style, twisted to one side or pendulous, few-seeded.

***V. annua*, Linn.** Annual Cress-rocket. E. B. 1442, L. C. 16. Root small, tapering, stems erect, bushy, rough, with deflexed bristles. Leaves two, pinnate, with linear segments. Flowers small, in terminal clusters. Pouch ribbed, bristly, crowned by the ovate, curved, rigid style. Stated by Ray to have been found on Salisbury plain. Battersea Fields and Wandsworth steam-boat pier. Annual. June.

A. 2 (♀), C. 2 (♀). Lat. 51°—52°. Alt. ? T. ?

It was noticed first in 1852, and in every subsequent year till 1855, in which it was not visible. In 1853 it occurred, but sparingly, on soil laid on Battersea Fields. The plant has disappeared at Battersea, and the Wandsworth station has undergone changes which will at no distant period diminish the rich harvest of exotics which have been collected here during the last seven years (1858).

SUB-TRIBE II.—Fruit compressed perpendicularly to the partition; partition narrow, often linear. Valves boat-shaped; keel often winged.

Genera.—*Teesdalia*, *Thlaspi*, *Hutchinsia*, *Iberis*, *Lepidium*, *Capsella*.

SYNOPSIS OF THE GENERA.

Teesdalia. Leaves mostly radical, lyrate-pinnate, in a rosette. Pouch ovate, two-seeded, crowned by the nearly sessile stigma.

Thlaspi. Leaves entire or sinuate-dentate; stem-leaves clasping. Pouch roundish-obovate, deeply notched. Seeds numerous.

Hutchinsia. Pouch elliptical, with two seeds in each cell.

Iberis. Leaves entire or toothed at the apex. Petals unequal. Pouch roundish or obovate-rounded, deeply notched, one-seed in each cell, crowned by the style.

Lepidium. Pouch roundish-ovate or oblong, slightly notched with one-seeded cells.

Capsella. Pouch triangular-obcordate, compressed with boat-shaped (navicular) valves and numerous seeds.

XXIII. *Teesdalia*, Br. *Teesdalia*. Small, annual plants, with numerous lyrate-pinnatifid radical leaves in a rosette. Stalks several, of which the central one is leafless. Flowers clustered. Calyx spreading; sepals equal at the base. Petals obovate, entire, equal, or unequal, and in this case the two outermost are the largest. Filaments sometimes four, with a scale at the base of each. Silicle roundish, compressed, concave on one side, keeled below and winged above (boat-like valves with dilated keels). Seeds two in each cell.

***T. nudicaulis*, Br.** Stems several, nearly erect, the central one always so, a few inches long, almost leafless. Leaves radical,

numerous in a rosette, lyrate-pinnatifid, with obtuse entire lobes; outer stems with two-three small entire or toothed leaves, central stem usually naked. Petals unequal, the outermost being largest. Pedicels of the fruit spreading. Fruit (silicle-pouch) apparently concave on one side (surrounded with an incurved rim) in an elongated cluster. On barren sandy heaths and gravelly dry places. On Barnes Common and Putney Heath. Annual. April.

A. 15, C. 50. Lat. 50° — 54° . Alt. 0—300 yards. T. 52° — 45° .

The former of these localities has been cut in two by the London and Windsor Railway, and a large portion of it is covered by two *Necropolistic* establishments. The above plant, however, still grows on it, and also *Acorus pseudacorus*, *Hydrocharis morsus-ranae*, and *Actinocarpus Damasonium*. Putney Heath has recently been selected for the reservoir of the Chelsea Water Company. *Rumex maritimus* used to grow here.

XXIV. *Thlaspi*, Linn. Penny-Cress. Mithridate-Mustard. Perennial or annual plants. Stems round, smooth. Leaves undivided, rarely pinnatifid. Flowers white, in terminal leafless racemes. Calyx slightly spreading; sepals equal at the base. Petals obovate, sometimes slightly notched, with short broad claws. Silicle roundish and notched, or obcordate, crowned by the short style, two-celled; valves strongly keeled, mostly winged. Seeds several in each cell, with accumbent cotyledons.

1. ***T. arvense*, Linn.** Penny-Cress. E. B. 1659, L. C. 60. Stems glabrous, erect, branching above or simple. Root-leaves ovate-oblong, tapering into a petiole, entire or sinuated. Stem-leaves oblong, deeply-cordate, arrow-shaped at the base, with short acute auricles. Fruit large, roundish, flat, with a large membranous border, more or less cleft at the apex, with contiguous lobes sometimes partly covering each other. Seeds about four or five in each cell, strongly striated, with curved striae. Fields and waste places. Battersea Fields. Annual. June.

A. 18, C. 60. Lat. 50° — 60° . Alt. 0—200 yards. T. 52° — 46° .

The altitude of this plant may safely be stated at 300 yards. It was gathered in Clent, on the Walton Hills, which are about 1000 feet high, and cultivation extends to their summit.

2. ***T. perfoliatum*, Linn.** Perfoliate Shepherd's Purse. E. B. 2354, L. C. 61. Root fibrous, fibres long, tapering. Stems leafy, erect, branched from the base, branches spreading. Root-leaves stalked, ovate, obtuse. Stem-leaves sessile, clasping, lanceolate or oblong, toothed. Fruit in short terminal clusters, on horizontal pedicels, rather longer than the slightly turgid, obcordate, rounded pouches, bordered by a membranous rim. Seeds numerous, ovate, yellowish. Sapperton Tunnel, near Cirencester, Gloucestershire. Annual. April, May.

A. 2, C. 2. Lat. 51° — 52° . Alt. ? T. 48° (?).

3. ***T. alpestre*, Linn.** *T. virens*, Jord. Alpine Penny-Cress. L. C. 62 c. Stems several, from the crown of the root; erect or ascending,

simple, leafy, with a roseate tuft of leaves at or near the base. Lower leaves spathulate or obovate in a rosette, on tapering petioles; stem-leaves clasping, with sharp-pointed auricles and toothed margins. Flowers large. Petals longer than the sepals. Fruit in elongated clusters; pedicels as long as the pouches, horizontally spreading. Pouches oblong, tapering at both ends, terminated by the long persistent style (*the style is about as long as the extent of the diameter of the fruit*). Matlock, Derbyshire. Annual or perennial (?).

Var. *occitanum*, Jord. Alpine Shepherd's Purse. E. B. 81, L. C. 62 b. Stems erect, simple, several from the same root, smooth, leafy. Root-leaves in dense tufts (rosettes), roundish, spathulate, on long tapering petioles. Stem-leaves clasping, ovate-oblong, toothed. Clusters elongated after flowering. Sepals short, blunt. Petals much longer than the calyx, spathulate, tapering below. Fruit (pouch) triangular-obcordate, deeply-notched, turgid, crowned by the long style. Limestone. Mountain-pastures. Yorkshire. West Riding. Perennial. July.

These two forms, *virens* and *occitanum*, differ slightly in their foliage. *T. virens* is of a lively green colour, and has larger flowers than *T. occitanum*; the pouch is narrowly winged, and the style is exserted (considerably longer than the lobes of the capsule). *T. occitanum* has longer clusters, smaller flowers, and shorter styles. These characters, if constant, might be sufficient to distinguish the two forms.

XXV. Hutchinsia, Br. Hutchinsia. Perennial or annual plants. Leaves smooth, pinnatifid or pinnate. Flowers in terminal racemes. Calyx spreading; sepals equal at the base. Petals obovate, entire. Silicle elliptic-oblong, nearly entire, two-celled; valves keeled, but not winged; cells bearing two or more pendulous seeds.

H. petraea, Br. Rock Hutchinsia. E. B. 114, L. C. 64. Stems solitary or several, very slender, simple or branching at the base, leafy and clothed with short down. Root-leaves petioled, pinnate, with six-eight pairs of leaflets, with an odd one; stem-leaves sessile, with fewer leaflets or segments. Flowers in clusters, which are elongated in fruit; pedicels longer than the fruit, spreading. Pouches oblong, blunt, two-celled, with two seeds in each cell. Limestone rocks. Annual. April. Naturalized on Eltham churchyard wall. Malham Tarn, Yorkshire.

A. 6, C. 10. Lat. 51° — 55° . Alt. 0—450 yards. T. 49° — 44° .

XXVI. Iberis, Linn. Candy-tuft. Herbaceous or in some cases slightly shrubby plants. Leaves sessile, toothed at the apex or entire. Flowers terminal, corymbose, or even umbellate. Calyx slightly spreading; sepals equal at the base. Petals obovate, spreading, with short claws, unequal, the two outermost being the largest. Silicle ovate or roundish, with keeled and winged valves, crowned with the persistent style. Seeds solitary, pendulous, one in each cell.

I. amara, Linn. Bitter Candy-tuft. E. B. 52, L. C. 66. Stems

erect or ascending, rigid, branched. Leaves somewhat fleshy, oblong, blunt, tapering into a linear base, with *two-three blunt teeth on each side at the top*. Flowers white, in short corymbose clusters. Fruit on spreading pedicels in spicate clusters, roundish, notched with short, triangular, not divergent lobes, which are surpassed by the style. Chalky fields. Annual. June, July.

Plentiful about Streatly and Goring, near Reading, Berks. On hills above Whitchurch, a lilac-flowered variety is not scarce.

XXVII. *Lepidium*. Linn. Pepperwort. Hoary or glaucous, herbaceous or shrubby plants, of a hot pungent flavour. Stems tapering, branching. Leaves entire, toothed, or pinnatifid. Flowers small, white. Sepals elliptical equal. Petals obovate. Stamens sometimes fewer than six. Silicle roundish or oblong, either entire or notched, crowned by the stigma, two-celled; valves keel-shaped. Seeds one in each cell, three-sided or compressed, pendulous.

SECT. I.—Pouch cordate.

1. ***L. Draba***, Linn. Whitlow Pepperwort. E. B. 2683, L. C. 68. Stems round, hairy, erect or reclining at the base, flexuous, branching above; branches corymbose. Leaves *oblong or ovate*, downy or hairy, sinuate, toothed; root-leaves attenuated into petioles; stem-leaves sessile, clasping, slightly auricled at the base. Pedicels spreading. Fruit *triangular-cordate*, entire at the apex, turgid, nearly *didymous*, terminated by the style, which is rather longer than half the length of the ripe capsule. By the Thames-side, Battersea, above where was the Red House, between the pier and the Prince Albert. Introduced. Steam-boat pier, Wandsworth. Chalk quarries, Northfleet. Perennial. July.

A. 4, C. 6. Well-established in Kent and Surrey.

SECT. II.—Pouch ovate, notched, valves winged.

2. ***L. campestre***, Br. Field Mustard. E. B. 1385, L. C. 70. Stems erect, rarely simple, always branching above, leafy, covered with short spreading hairs. Leaves soft, pubescent; root-leaves in a rosette, oblong, tapering into a petiole, more or less deeply toothed or cleft; stem-leaves oblong-lanceolate, *sagittate-clasping*, toothed. Pedicels spreading in fruit. Fruit covered with little scales, ovate-oblong, notched; *style scarcely exceeding the contiguous lobes*. Fields. Biennial. May.

A. 16, C. 60. Lat. 5° — 58° . Alt. 0—200 yards. T. 51° — 46° .

3. ***L. Smithii***, Hook. *L. hirtum*, Sm. Smith's Pepperwort. E. B. 1803, L. C. 69. Stems round, slender, prostrate, or ascending. Root-leaves tufted, obovate, slightly toothed, on long slender footstalks. Stem-leaves clasping; all soft, hairy, and more or less toothed. Pedicels rather longer than the fruit, very hairy. Pouches nearly erect, convex outwardly and concave inwardly, lobes more or less unequal. Style about thrice as long as the notch. Under hedges;

near Itchen Ferry, Southampton. North Wales. Perennial. July, August.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—350 yards. T. 52°—43°.

SECT. III.—Pouch orbicular, notched or entire, not winged.

4. **L. latifolium**, Linn. Broad-leaved Pepperwort. E. B. 182, L. C. 67. Stems *erect*, stout, branching above, mostly glabrous, more or less glaucous. Leaves glabrous and glaucous, the lower large, *ovate-oblong*, laxly toothed, on long petioles; the upper leaves *elliptical-lanceolate*, tapering both ways, mostly with short distant teeth. Flowers in dense clusters; clusters panicle. Petals larger than the calyx. Fruit downy, roundish, scarcely notched at the summit. Valves not winged. Style short. Shady moist places near the sea (?). Perennial. June—August.

A. 6, C. 10. Lat. 50°—55°. Alt. ? T. ?

L. graminifolium, Linn. *L. Iberis*, Poll. Rchb. Ic. Fl. Ger., vol. ii., 10. Stems slender, erect, with numerous branches. Leaves (of the stem) linear-lanceolate, quite entire, pointed. Flowers small, white. Wandsworth steam-boat pier. Perennial. July.

5. **L. ruderale**, Linn. Stinking Cress. Narrow-leaved Pepperwort. E. B. 1595, L. C. 71. Stems erect or spreading, with spreading branches, almost woody at the base. Root-leaves in a rosette, petioled, pinnate, with linear leaflets; upper leaves *sessile*, *simple*, *linear*, *tapering below*. Petals very small or none. Pedicels of the fruit spreading. Pouch ovate, roundish, notched, lobes short, not spreading; valves narrowly winged above. Rubbish, about the banks of tidal rivers, near towns, by the foot of walls. Annual. June, July,

A. 6, C. 12. Lat. 50°—53°. Alt. ? T. 52°—49°.

L. sativum, Linn., Common Cress, is partially naturalized on waste places, where the refuse of gardens has been thrown. The flowers vary between white, pink, and lilac.

XXVIII. **Capsella**, D. C. Shepherd's-purse. Annual plants. Stem tapering and branching. Radical leaves in rosettes, entire, at the narrow base toothed or incised, or variously lobed above; stem-leaves sagittate at the base. Flowers in terminal racemes on longish pedicels, small and white. Calyx equal at the base. Petals entire. Pouch obversely triangular; valves keeled. Seeds numerous.

C. Bursa-pastoris, Linn. Shepherd's-purse. E. B. 1485, L. C. 63. Root tapering, fleshy, slightly fibrous. Stems solitary or numerous, upright, simple or branched, more or less pubescent. Leaves more or less hairy on both sides; the radical leaves disposed in a rosette, very variable, lyrate or pinnatifid, with triangular or linear lobes; upper leaves entire or toothed, clasping the stem, and slightly auricled. Fruit in long clusters on spreading pedicels. Everywhere in the vicinity of human abodes, waysides, and other places. Annual. It is in flower during nearly the whole year.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

Sub-var. *integrifolia*. All the leaves entire. A variety, with doubly pinnatifid leaves and acute segments, also with dense, abortive clusters, and very large, spreading, fertile pouches, was observed on the Walton Hills, above the church of Clent, near Stourbridge.

TRIBE II.—Fruit not opening, rarely with valvular dehiscence.

Genera.—*Subularia*, *Senebiera*, *Isatis*, *Cakile*, *Crambe*.

SYNOPSIS OF THE GENERA.

Subularia. Aquatics, with subulate leaves, and small white flowers.

Senebiera. Leaves deeply pinnatifid. Flowers small, in short clusters, opposite to the leaves. Pouch reniform at the base, not notched, with two one-seeded cells.

Isatis. Leaves entire, stem-leaves clasping. Pouch oblong or obovate-oblong, one-celled by abortion.

Cakile. Pouch angular, containing two one-seeded cells.

Crambe. Pouch jointed; upper joint globose, one-celled, one-seeded; lower joint barren.

XXIX. *Subularia*, Linn. Awlwort. Aquatic and stemless small plants. Calyx erect, equal at the base. Petals obovate, spreading, with short claws. Silicle, elliptic-oblong, entire, crowned with the stigma, two-celled; valves turgid, boat-shaped, not keeled. Seeds in two rows, four or more in each cell.

***S. aquatica*, Linn.** Water Awlwort. E. B. 732, L. C. 74. Root with numerous, long, white fibres, and crowned with the small leaves and flower-stalks. Leaves subulate, spreading, an inch or two inches long. Flowers few, white, on a radical common peduncle, in a simple cluster. Pouches erect, elliptical or obovate. On the sandy or gravelly bottoms of alpine lakes, under water. Annual. July.

A. 4, C. 10. Lat. 53°—59°. Alt. (?)—700 yards. T. 47°—39°.

XXX. *Senebiera*, Poir. Wart Cress. Often diffuse or prostrate, mostly smooth, plants. Flowers in small axillary clusters. Calyx spreading. Sepals equal. Petals ovate or obovate, sometimes absent. Silicle roundish, two-lobed, two-celled, indehiscent; valves rugged or crested, each bearing a single seed. Seeds pendulous, oblong, angular. Radicle dorsal, near the dorsal nerve of the valve.

1. *S. Coronopus*, Poir. Swines' Cress. E. B. 1660, L. C. 58. Stems numerous, prostrate, diffuse, branching, glabrous. Leaves somewhat fleshy, deeply pinnatifid; lobes of the lower leaves pinnatifid, of the upper ones linear, entire, or incised. Flowers in round, axillary clusters, on short pedicels. Fruit (silicle) compressed, broad, reniform at the base, reticulated, wrinkled, with tubercles on the margin. Sepals often permanent. Roadsides; by walls, &c. Annual. June.

A. 15, C. 50. Lat. 50°—58°. Alt. 0—100 yards. T. 52°—47°.

2. *S. didyma*, Pers. *S. pinnatifida*, D. C. Lesser Wart Cress. E. B. 248, L. C. 57. Stems spreading, or nearly erect, not glabrous.

Leaves pinnate; leaflets pinnatifid only on the upper side, the lower one entire; lobes obovate or oblong, pointed. Fruit on *long pedicels*, *didymous*, notched at the summit, tubercled or wrinkled. Naturalized in several places in the South of England; Channel Islands. Annual. June.

A. 4, C. 10. Lat. 50°—54°. Alt. 0—100 yards T. 50° (?).

This has been collected in the following inland localities since 1835:—Highgate, Middlesex, near the Archway; Brixton, Surrey, not far from the church; Battersea Fields, Kew Churchyard, Parson's-green, near Little Chelsea.

XXXI. *Isatis*, Linn. Woad. Tall, erect, branching, glaucous plants, either annual or biennial. Leaves mostly entire, lower petiolate, upper ones sessile and stem-clasping. Flowers clustered. Inflorescence corymbose, terminal. Calyx spreading, equal at the base, coloured. Petals obovate, tapering into short claws. Silicle roundish, compressed, one-celled by abortion, two-valved. Cells one-seeded. Valves flat and keeled.

***I. tinctoria*, Linn.** Dyers' Woad. E. B. 97, L. C. 59. Stems erect, rigid, glabrous or downy, branching at the top. Root-leaves oblong, attenuated into a long petiole. Stem-leaves lanceolate, sagittate. Flowers small, yellow, in dense clusters. Fruit pendulous, oblong, blunt or slightly notched, tapering at the base, on long, slender pedicels. Chalk quarries, near Guildford, Surrey; in a chalky field, in which there is a chalk-quarry, on the cliffs of which, and on the *débris* of the quarry itself, the plant has grown very plentifully for many years (since the beginning of the present century). Fields, Norfolk. Biennial. May, June.

A. 9, C. ?

XXXII. *Cakile*, Gärt. Sea Rocket. Annual, maritime plants. Stem and leaves fleshy. Flowers racemose. Calyx nearly erect, two sepals protuberant at the base. Petals obovate, spreading, with long claws. Anthers cloven at the base. Silicle angular, with two joints, compressed; each joint of one cell, indehiscent; the upper deciduous and fertile, bearing one erect seed; the lower persistent, seedless, or with one pendulous seed.

***C. maritima*, Scop.** Purple Sea Rocket. E. B. 231, L. C. 55. Stem erect, much divided; branches flexuous or zigzag. Leaves pinnatifid, fleshy, with linear, entire or lobed, obtuse, mucronate segments. Flowers lilac, large, handsome, in simple racemes, which are elongated in fruit. Fruit lomentaceous; the lower joint bordered all round with a prominent ridge; upper joint elliptical or oblong, compressed, pointed; the ridges of both joints are connected by smaller branching ridges. Sandy sea-shores. South of England (?). Annual. July—September.

A. 12, C. 25. Lat. 50°—56°. Alt. ? T. 52°—48°.

Rapistrum rugosum, All. The aspect of this plant much resembles *Sisymbrium polyceratium*, especially in the disposition of the pods,

which are appressed to the stem. The stem is erect, angular; the lower leaves lyrate, very large, on long stalks; the upper smaller, oblong, and sessile. The fruit consists of two joints, the lower one cylindrical and barren, the upper globular and one-seeded; pod not opening. One of the very commonest of the exotic *Crucifers*, in the Wandsworth steam-boat pier station. Annual. July—September. Sandy fields, South of France.

XXXIII. *Crambe*, Linn. Sea Kale. Herbaceous or slightly shrubby plants. Leaves fleshy, toothed, pinnatifid or lyrate, either smooth or hairy. Flowers white, in clusters. Calyx spreading; sepals nearly equal at the base. Petals spreading, claw of equal length with the rounded limb. Silicle coriaceous, with two one-celled joints, not dehiscent, the lower abortive, the upper deciduous, with one pendulous seed, on a long curved funicle, springing from the bottom of the cell.

C. *maritima*, Linn. Sea Kale. E. B. 924, L. C. 56. Root large and fleshy. Stems several, stout, two feet high, branched, spreading, leafy; whole herbage very glaucous. Leaves stalked, ovate, rhomboid, lobed and toothed. Clusters terminal, more or less dense. Flowers large, white. Fertile part of the pod round, with a short, thick beak. Sea-shores. Perennial. May—June.

A. 12, C. 25. Lat. 50°—56°. Alt. ? T. 52°—48°.

TRIBE III.—Pods jointed, not opening.

XXXIV. *Raphanus*, Linn. Radish. Stems upright, branched, annual or biennial, with their lower leaves lyrate. Calyx erect, two of the sepals protuberant. Petals obovate or obcordate, with linear, erect claws. Stamens with four intermediate glands. Pod tapering upwards, spongy within, incompletely two-celled, with a long beak, indehiscent, or dividing across into two one-seeded cells. Seeds pendulous.

R. *sativus*, Linn. Common Radish. Root fleshy. Stem erect, branching, more or less hairy. Flowers white, cream-coloured or violet, with deep violet veins. Pod oblong-lanceolate, without transverse partitions, tapering gradually into a beak. Scarcely naturalized, though not unfrequent in corn-fields near towns and villages. Annual. June.

1. **R. *Raphanistrum*, Linn.** Wild Radish. E. B. 856, L. C. 123. Root tapering, vertical, slender. Stem erect, branching, one-two feet high, rigidly hairy. Leaves lyrate, rough, with a large toothed terminal lobe. Flowers large, yellow or white, with bluish-violet veins. Pod linear-oblong, moniliform (necklace-like), when ripe separated by transverse partitions forming one-seeded cells, abruptly contracted into a long subulate beak. Fields. Annual. May—August. A very variable plant.

A. 18, C. 80. Lat. 50°—61°. Alt. 0—350 yards. T. 51°—43°.

This plant has been seen in one of our midland counties at an elevation of 300 yards.

2. *R. maritimus*, Sm. Sea Radish. E. B. 1643, L. C. 124. Root large and succulent. Stem three-four feet high, rough chiefly at the base. Root and lower stem-leaves more serrated than in *R. Raphanistrum*; upper simple and serrated. Flowers yellow, and less veiny than in the above species. Pods more strongly and broadly furrowed, not rough.—Smith, in "Eng. Fl.," vol. iii., p. 227.

A. 7, C. 10. Lat. 50°—56°. Alt. ? T. 52°—48°.

R. Landra, Moretti. The upper leaves of what we suppose may be this species are coarsely serrated, with very unequal sharp teeth. The flowers are much smaller than in the preceding species (forms?). The style is three times as long as in *R. sativa*, becoming a long tapering beak, usually longer than the pod, which consists of three-four joints. Is this plant, which grows about Wandsworth and Battersea, a variety of *R. maritimus*?

Enarthrocarpus lyratus, D. C., has abounded in this locality for some years. In Grenier and Godron's "Flore de France," this plant is enumerated among the excluded species with the following remark:—"Introduites accidentellement dans cette localité; Juvenal, près de Montpellier, où elles ont depuis longtemps disparu." It cannot be permanent in the Surrey locality, for the space is gradually becoming covered with buildings.

ORDER XCVIII.—**FUMARIACEÆ**, D. C. THE FUMITORY FAMILY.

Annual or perennial herbaceous plants, with brittle stems. Leaves mostly alternate, many-parted or cleft, often with tendrils. Flowers in terminal or lateral clusters. Sepals two, deciduous. Petals four, cruciate, parallel; the two outer, or one of them, saccate or gibbous at the base, the two inner cohering at the apex, where they enclose the anthers and stigma. Stamens six, in two parcels. Anthers extrorse. Ovary superior, one-celled. Style filiform. Fruit dry, one-celled, one-seeded, not opening, or many-seeded, opening by two valves. Seeds reniform. Albumen fleshy, thick. Radicle near the hilum.

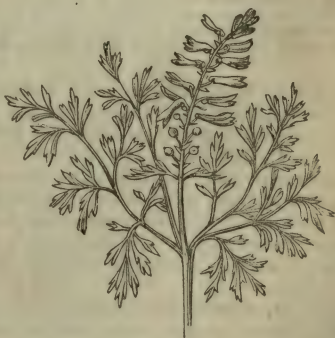


Fig. 195.—*Fumaria officinalis*. A branch, with leaves and cluster of flowers.

SYNOPSIS OF THE GENERA.

Corydalis. Fruit a compressed, two-valved, many-seeded pod.

Fumaria. Fruit one-seeded, not opening.

I. *Corydalis*, D. C. Perennial Fumitory. Perennial plants, with solitary or several stems. Leaves divided. Flowers clustered,



Fig. 195.—*Fumaria officinalis*. 1, Flower; c, calyx. 2, The stamens, in two parcels (bundles); 3, a detached parcel, showing the united filaments; 4 and 5, two views of the united anthers; 6, the ovary, with its style and stigma; 7, section, showing the fruit; 8, fruit; 9, section of same, showing the albumen and radicle.

yellow or pink, rarely white. Petals more or less coherent at the apex, gibbous, spurred at the base. Fruit an elongated, pod-like, compressed, opening seed-vessel. Seed with an aril.

1. ***C. lutea*, D. C.** Yellow Fumitory. E. B. 588, L. C. 49. Roots scaly, succulent, tufted. Stems numerous. Leaves bipinnate; leaflets stalked, ovate-oblong, incised, cuneate at the base. Bracts linear-lanceolate, shorter than the pedicels. Flowers yellow, with a short curved spur. Seeds finely granulated, with spreading arils. On old walls. Perennial. June. *Wall near Old Stone Toll bar*
Alien. *perth*

2. ***C. solida*, Sm.** Tuberous-rooted Fumitory. E. P. 1471, L. C. 49*. Stem solitary, erect, simple, with a rudimentary leaf (scale). Leaves radical, bi-tripinnate. Bracts cuneate, incised. Flowers purple. Naturalized and plentiful in a wood at Totteridge, Herts. Common in gardens. Perennial. April. See "Phytologist," N. S., vol. i., p. 391.

3. ***C. claviculata*, D. C.** White-flowered Fumitory. E. B. 103. Roots fibrous. Stems angular, weak, trailing, climbing, branching. Leaves bipinnate below, often ternate above, ending in a branching tendril; leaflets elliptical, pointed, pale yellowish-green. Bracts lanceolate, longer than the pedicels. Flowers in short clusters, white,

blunt spur. Fruit cylindrical, tur-
y, bushy places. Annual. June—

Alt. 0—400 yards.

abundant and ornamental on cottage
an places, where it sometimes covers
(See "Phytologist," N. S., vol. i.,

rt. Fumitory. Annuals. Stems
ase, climbing. Leaves bi-tripinnate.
rple or green at the tips. Sepals
r, the lower channelled and spurred,
x, the two lateral ones winged and
r one with a long claw, dilated only
Fruit roundish, one-seeded, not

mon Fumitory. E. B. 589, L. C.
ed, spreading. Leaves bipinnate,
oblong, linear, blunt, or pointed.
ers; bracts small, herbaceous, with
; shorter than the ovary, nearly
incisions and sharp teeth. Fruit
ightly depressed at the summit, with
s. Annual. May, June, &c.

Alt. 0—200 yards. T. 52°—45°.
isted; flowers white or pale rose-
he common form.

amping Fumitory. E. B. 943, L. C.
ed solid with prominent angles.

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1876,

Fumaria m. crassa

Ungues of the stem prominent. Leaves reflexed; leaflets lacinate.
ed. Flowers in rather dense spikes on spreading pedicels
acts longer than the pedicels, pointed not-acuminate. Sepals round-
shed much broader than the corolla. Flowers red with a deeper
the purple tips. Fruit rounded not depressed.
(Rotten castle fields near)

L. C. 52. Stems angular, branching, bipinnate, with linear, flat segments. Flowers purple or rosy, in more or less dense clusters. Sepals *roundish, toothed*, nearly one-third of the length of the corolla. Bracts *longer than the flower-stalks*, but not longer than the fruit-stalks. Fruit roundish, slightly depressed, sometimes shortly apiculate. Corn-fields. Annual. July.

A. 10, C. 50. Lat. 52°—57°. Alt. 0—200 yards. T. 49°—47°.

5. **F. Vaillantii**, Lois. Vaillant's Fumitory. E. B. 2877, L. C. 54. Stems spreading, branched, angular, and furrowed. Leaflets (segments of leaves) linear, narrow, now and then notched. Bracts nearly as long as the pedicels, with scarious edges and sharp tips. Sepals one-sixth part of the length of the corolla. Corolla white, with purple tip. Fruit round, surmounted with a point when young. This point disappears when the fruit is ripe. Saffron-Walden, Essex. Annual. June, July.

Area, &c., as in *F. parviflora*, from which it is scarcely distinguishable.

F. agraria, Lag., *F. major*, Reich. 4455, is reported from Ambleside, Westmoreland, in "Bot. Gaz.," vol. ii., p. 54. The following character is drawn up from a specimen grown at Wandsworth steam-boat pier, and compared with Grenier and Godron's description, "Flore de France," vol. i., p. 67:—Leaves bipinnate, with lanceolate segments. Flowers in lax clusters, with lanceolate bracts, which equal or exceed the pedicels of the flowers (shorter than the pedicels of the fruit). Sepals *ovate-lanceolate*, toothed, narrower than the corolla, and only one-third of its length. Fruit globular, *rough*, rounded at the summit, and *pointed at the base of the style*. Seeds depressed at the summit, nearly round. South of France. Annual. June—August.

The following distinctive characters of these species are drawn up chiefly from the sepals and the fruit:—

F. officinalis. Sepals less than half as long, and nearly as broad as the corolla. The fruit is almost obcordate, depressed at the apex, and slightly apiculate.

F. micrantha. Sepals broadly ovate, much broader than the tube of the corolla, and half as long. The fruit is globular, very slightly depressed, and faintly apiculate at the summit.

F. capreolata. Sepals about as broad as the corolla, and about half as long. The fruit is globular, not apiculate.

F. Vaillantii. Sepals very small, scarcely one-sixth part as long as the corolla, and much narrower. Fruit globular, rounded, and not apiculate at the summit.

F. parviflora. Sepals broader than in *F. Vaillantii*, and about as long as they are in that species. The fruit is globular and apiculate at the summit.

F. agraria. Sepals narrower than the corolla, and about one-third as long. The fruit is globular, rounded at the apex, and apiculate.

ORDER XCIX. **PAPAVERACEÆ**, Juss. THE POPPY FAMILY.

Herbaceous annual or perennial plants, with milky or coloured juice, and alternate, divided leaves. Sepals two, deciduous. Petals either four, or some multiple of four, cruciate. Stamens generally very numerous. Ovary solitary, style short or absent. Stigmas alternate with the placentas, either two or many, and radiated upon the apex of the ovary. Fruit one-celled, pod-shaped, or capsular, with two or with several parietal placentas. Seeds numerous.

SYNOPSIS OF THE GENERA.

Papaver. Juice milky white; stigmas four-twenty, radiate; partitions of the fruit incomplete.

Meconopsis. Juice milky, yellow; stigmas four-six radiate; partitions wanting.

Rœmeria. Stigmas capitate; fruit one-celled, linear (like a pod).

Glaucium. Stigmas capitate; fruit two-celled, with a spongy partition.

Chelidonium. Stigmas two, oblique; fruit one-celled, two-valved.

I. *Papaver*, Tournf. Poppy. Annual or perennial plants, with milky narcotic juice. Stems round. Leaves incised, pinnatifid, or pinnate. Flowers lateral or terminal, on long peduncles, large, fugacious. Calyx with two sepals, deciduous. Petals four, crumpled in pre-floration, spreading. Stamens indefinite, with erect anthers. Ovary globular or oblong, with a radiated persistent stigma. Fruit coriaceous, one-celled, or with as many spurious cells as the stigma has rays; with numerous seeds.

1. ***P. somniferum***, Linn. Garden Poppy. E. B. 2145, L. C. 43. Stems erect, robust, simple or branching, very glaucous and glabrous. Leaves sinuate, toothed or crenate, usually wavy; the stem-leaves oblong or obovate, cordate, clasping, *all glabrous and glaucous*. *Sepals glabrous*. Petals large, purple, violet, parti-coloured, white. Filaments enlarged above. Stigmas eight-fifteen. Fruit (capsule) roundish, glabrous. Fields and rubbish. Not uncommon in several parts of North Kent. In the Eastern Fens. Annual. June—September.

Alien. A. 11.

It is only subspontaneous on the Continent, where it is extensively cultivated for its juice (opium), and for its oleaginous seeds. It has

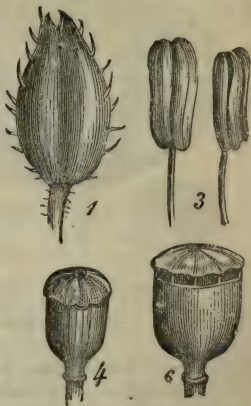


Fig. 196.—*Papaver Rhœas*. 1, Un-expanded bud, showing the sepals only; 3, stamens with anthers; 4 and 6, ovaries, showing the lobed stigmas.

been numbered among British plants during centuries, but it is not yet naturalized.

2. **P. Rhœas**, Linn. Field Poppy. E. B. 645, L. C. 42. Stems erect, branching, with long, spreading hairs. Leaves hairy,



Fig. 196.—*Papaver Rhœas*. 2, Flower expanded, showing the petals, the stamens, and ovary; 5, transverse section of the fruit.

pinnatifid, with oblong, toothed-incised lobes; teeth terminated by a hair. Peduncles and sepals furnished with long spreading hairs. Petals large, roundish, deep red. Stigmas eight-twelve. Capsule obovate-roundish; disk covered with callow, somewhat imbricated lobes. Fields. Annual. June.

A. 16, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

3. **P. hybridum**, Linn. Rough Round-headed Poppy. E. B. 45, L. C. 39. Stems stout, erect, branching, round, tapering hairy. Leaves pinnatifid; segments linear-pinnatifid or lobed

or toothed. Sepals clothed with rigid spreading hairs. Petals obovate-oblong, purplish. Stigmas four-eight. Fruit (capsule) roundish, ridged and furrowed with bristly spreading-ascending hairs, usually with eight ridges. Chalky corn-fields. Annual. June.

A. 9, C. 25. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—48°.

4. **P. Argemone**, Linn. Long-headed Rough Poppy. E. B. 643, L. C. 40. Stems erect or ascending, branching above. Leaves hairy, bipinnatifid, with lanceolate or linear lobes. Sepals hairy. Petals oblong-obovate, red. Stigmas four-six (four-six-rayed). Capsule oblong-clavate, more or less hairy. Fields. Annual. May—August.

A. 18, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—46°.

Sub-var. *glabratum*. Capsule nearly smooth.

5. **P. dubium**, Linn. Long Smooth-headed Poppy. E. B. 644, L. C. 41. Stems nearly solitary, erect, slender, hairy, furrowed. Leaves glaucous, with long hairs, pinnate, lobes oblong-lanceolate, entire or toothed, terminated by a bristle. Sepals hairy. Petals large, roundish, deep red. Stigmas five-ten. Fruit oblong, club-shaped, glabrous. Disk of the stigmas lobed, not overlapping each other. Corn-fields. Annual. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—200 yards. T. 51°—45°.

P. nudicaule, Linn. Hook, Br. Fl. 255. Naked-stalked Yellow Poppy. E. B. 2681, L. C. Excluded Species, p. 16. Stalk erect, stout, hairy, single-flowered. Leaves pinnatifid, with lanceolate acute, usually entire segments, all radical and clothed with tawny hairs. Petals yellow. Fruit hispid, obovate, four-six-ribbed. Achill head, north-west of Ireland. Professor Giessecke.

II. Meconopsis, Vig. Petals and stamens as in the kindred genera. Stigmas five-six, free, radiating, on a short style. Capsule obovate, opening by pores beneath the apex.

M. cambrica, Vig. Welsh Poppy. E. B. 201, L. C. 44. Stems erect, branching, round, more or less hairy, leafy. Leaves pinnate, with trifid, terminal leaflets, glaucous beneath. Flowers yellow, on long, hairy, tapering peduncles. Calyx hairy. Capsule smooth. About Settle, Yorkshire. Perennial. July, August.

A. 5, C. 10. Lat. 50°—55° (58°). Alt. 0—700 yards. T. 48°—44°.

Note.—This plant is apparently as wild in Perthshire and Kincardineshire as in Yorkshire. Its home in the British Isles is on the cliffy rocks of the Cambrian Alps. About Llanberris it is very common. It still exists on the Cheddar Cliffs, Somersetshire. (See "Phytologist," N. S., vol. ii., p. 241.)

III. Rœmeria, D. C. Annual plants. Sepals two, caducous. Petals four, crumpled before flowering. Style short. Stigmas capitate. Capsule elongated, one-celled, without a partition, *silicular* (a little or short pod), *three-four-valved*, opening from the summit to the base.

R. hybrida, D. C. *Glaucium violaceum*, Sm. and L. C. 47, E. B. 201. Stem erect, hairy, more or less branched. Leaves deeply cut, bi-tripinnatifid, with tapering lobes, terminating in a bristle. Peduncles shorter than the capsules, enlarged at their tops. Flowers large, of a beautiful violet. Sepals hairy, concave. Capsule linear, cylindrical, longitudinally striated, with spreading bristles. Seeds cinereous, reniform. Fields in Norfolk and Cambridgeshire. Annual. June. Wandsworth steam-boat pier. Very rare in the latter locality.

IV. Glaucium, Tournf. Herbage hoary, glaucous. Leaves pinnate or pinnatifid. Flowers large, nearly solitary, terminal. Sepals herbaceous, caducous. Petals four. Stigma capitate, two-lobed. Capsule elongate, linear (like a pod), *two-celled*, with a spongy dissepiment, opening by valvular dehiscence from the summit to the base. Seeds without an aril.

1. **G. luteum**, Scop. Yellow Horned Poppy. E. B. 8, L. C. 46. Stems reclining or ascending, robust, branching. Root-leaves lyrate-pinnatifid, with sinuate or toothed lobes, petiolate; stem-leaves embracing the stem, all very glaucous and more or less rough or tubercular. Capsules linear, cylindrical, often arcuate (shaped like a bow). Sea-shores. Biennial. July—September.

A. 16, C. 30. Lat. 50°—57°. Alt. ? T. 52°—48°.

2. **G. phœniceum**, Gärt. *G. corniculatum*, Curt. Scarlet Horned Poppy. E. B. 1433, L. C. Excluded Species. Slenderer, and not so glaucous as the preceding. Stem hairy. Leaves deeply pinnatifid, with narrower lobes than in *G. luteum*. Flowers smaller, on shorter peduncles. Petals red or orange, *with a purple spot at the base*. Capsule rough. At Wandsworth steam-boat pier. In this

locality it has been noticed from 1852 to 1855. Annual. June—September.

V. Chelidonium, Tournf. Perennial herbs, with a copious yellow milky juice, pinnatifid leaves and yellow flowers. Sepals two, slightly coloured. Stigma two-lobed. Capsule linear (like a pod), *one-celled*, with a *defective partition*, opening by two valves from the base to the summit. Seeds arillate.

C. majus, Linn. Common Celandine. E. B. 1581, L. C. 45. Root thick, oblique or vertical. Stems erect, branching, with more or less spreading hairs. Leaves lobed; lobes three-seven, ovate, incised or crenate, glabrous, glaucous above. Sepals coloured. Capsule linear, slightly torulose (beaded). Seeds ovate, shining, with a white aril. Usually near houses; seldom far from human dwellings. Perennial. April—September.

^ Var. *β. laciniatum*, Rchb. Fl. Ger. 4467. Segments of the leaves pinnatifid, with straight linear lobes. Petals incised-crenulate. About Wimbledon, under hedges and on old walls.

Hypecoum procumbens, Linn. Rchb. Fl. Ger. iii. 9. Root-leaves bi-tripinnate, with linear segments. Outer sepals three-lobed, with a herbaceous tipped mid-lobe, inner parted, smaller. Pod torulose. Petals six, the lateral ones quite separated and united with the filamentous web of the anthers. Wandsworth steam-boat pier. Annual. July.

ORDER C.—**NYMPHÆACEÆ**, D. C. THE WATER LILY FAMILY.

Aquatics, with cordate or peltate, fleshy, floating leaves. Sepals

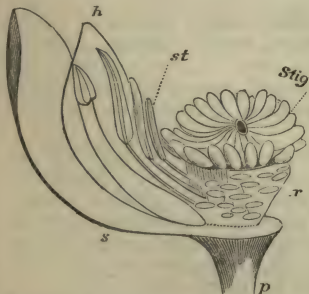


Fig. 197.—*Nymphaea alba*, portion of the flower; *p*, peduncle; *r*, receptacle on which the petals and stamens are inserted; *s*, a sepal; *h*, a petal; *st*, stamens; *stig*, the radiate stigma.

and petals numerous, imbricated, passing gradually into each other, the former persistent. Stamens indefinite, with petaloid filaments and adnate anthers. Ovary many-celled, polyspermous, with radiating stigmas. Fruit many-celled, indehiscent. Seeds very numerous, attached to spongy dissepiments. The British species have large floating leaves, on long petioles. Their flowers are on peduncles, which vary with the depth of the water wherein they are found. Their capsules are large, and crowned by the dilated or radiating stigmas. *Victoria regia*, one of the grandest aquatics, has leaves above four feet in diameter,

with large and odoriferous flowers. This magnificent plant grows in

the great rivers of South America. The white Water Lily, which adorns our standing waters, is one of the very noblest of British plants.

SYNOPSIS OF THE GENERA.

Nymphæa. Flowers white.

Nuphar. Flowers yellow.

I. **Nymphæa**, Linn. White Water Lily. Aquatics without a stem. Leaves large, cordate, floating, on long foot-stalks. Flowers solitary, on long simple stalks. Sepals four, coriaceous, permanent, coloured on the inside. Petals numerous, in several rows on the base of the ovary. Stamens indefinite, inserted with the petals, the outer ones gradually dilated. Anthers linear, attached by their whole length to the filament (adnate). Ovary globose, with an orbicular, sessile, radiated, permanent, stigma. Fruit baccate, with as many cells as there are rays in the stigma, with numerous seeds.

N. alba, Linn. E. B. 160, L. C. 36. Leaves cordate, ovate-rounded, with contiguous almost parallel lobes. Flowers white or pale rose. Rivers/ & Perennial. July. *lakes.*

A. 18, C. 70. Lat. 50°—61°. Alt. 0—400 yards. T. 52°—45°.

For distinctive character of the leaves of the white and yellow Water Lilies, see "Phytologist," N. S., vol. i., p. 477.*

II. **Nuphar**, Sm. Sepals obovate-roundish, coloured, *persistent*. Petals ten-twenty, obovate, shorter than the sepals, thick, fleshy, in two rows, with longitudinal prominences, corresponding to the anther-lobes. Fruit ovate, smooth, crowned by the radiate stigmas.

1. **N. luteum**, Sm. Yellow Water Lily. E. B. 159, L. C. 37. Leaves ovate, coriaceous, deeply cordate, with *slightly divergent lobes* on a slightly triangular petiole. Petals shining, *gradually attenuated at the base*. Stigmas umbilicate, *entire or slightly undulate*. Fruit tapering into a slender neck. (The name Brandy-bottle is descriptive of the shape of the fruit.) In deep waters. Perennial. June—September.

A. 16, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

2. **N. pumilum**, Sm. Least Yellow Water Lily. E. B. 2292, L. C. 38. Leaves with *parallel or slightly divergent lobes*. Petals roundish, *abruptly tapering into a claw*. Disc of the stigmas strongly umbilicate. Lakes. Perennial. July.

A. 2, C. 4. Lat. 56°—58°. Alt. ? T. 45°—44°.

The plant is much smaller than *N. luteum*, with flowers about as large as those of *Caltha palustris*. In several Scottish lakes. Lake at the foot of Ben Cruachan, Mr. Borrer; in a mere near Ellesmere, Shropshire, Rev. T. A. Cox. (See "Phytologist," N. S., vol. i., p. 127.) Loch Kinnord, Cromar, Aberdeenshire. Wm. Sutherland. An interesting addition to our Flora. *Loch of Moncreiffe John Sm*

* In the white Water Lily the leaf is rounded-ovate, usually purplish beneath, the lobes at the base are almost parallel, and the leaf-stalk is cylindrical. The leaves of the yellow Water Lily are ovate pointed, not rounded at the apex, as is the case in those of the white Lily; the basal lobes are slightly divergent, and the leaf-stalk is angular, especially in the upper part.

ORDER CI.—**RESEDACEÆ**, D. C. THE MIGNIONETTE FAMILY.

Herbaceous, rarely shrubby, plants, with alternate leaves, and minute, gland-like stipules. Flowers in terminal spike-like clusters. Calyx many-parted. Petals four-six, entire or lacerated, unequal. Stamens definite, ten-twenty. Ovary three-lobed, one-celled, many-seeded, with three-six parietal placentas. Stigmas three, sessile. Fruit opening at the apex. Seeds reniform, without albumen. Embryo cylindrical, plicate (folded). Radicle near the hilum. The favourite *Mignonette* is a species of this small family.

Reseda, Linn. Dyer's Rocket. Weld. Mignonette. Herbaceous plants, with minutely papillary surface. Leaves alternate, pinnatifid, or simple. Flowers racemose, numerous. Calyx monosepalous, deeply divided, with numerous narrow, irregular, persistent segments. Petals variable, more or less unequal, cleft or jagged, deciduous. Stamens variable, under twenty and more than ten, with oblong, erect anthers. Fruit three-five carpels, united into a one-celled capsule, opening at the apex. Seeds numerous.

1. **R. Luteola**, Linn. Dyer's Rocket. Weld. E. B. 320, L. C. 125. Stems rigid, erect, round, very angular or furrowed, glabrous, branching above, very leafy. *Leaves narrow, lanceolate, quite entire, glabrous*; the root-leaves often undulated. Flowers yellowish-green, in long, tapering, spike-like clusters, on very short, thick pedicels, with lanceolate bracts. Sepals (divisions of the calyx) four, lanceolate or elliptical, blunt. Petals cleft, with entire or toothed segments. Fruit roundish, three-lobed; lobes tapering to a truncate apex. Seeds smooth. Waste stony places, waysides, ruins. Biennial (?). July.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

2. **R. lutea**, Linn. Wild Mignonette. E. B. 321, L. C. 126. Stems reclining or ascending, spreading, branching, rigid, angular, hollow. Lower leaves oblong ovate, attenuated at the base; upper ones pinnate or bipinnate, lobes wavy or crisp. Flowers pale yellow, in compact terminal clusters. Calyx *in six spreading, linear divisions*. Fruit oblong, slightly attenuated at the base, *truncate, scarcely toothed at the top*, tubercled especially on the angles, granulated. Pedicels erect; bracts deciduous. Seeds smooth. Borders of chalky fields. Biennial. July.

A. 12, C. 30. Lat. 50°—58°. Alt. 0—100 yards. T. 51°—47°.

3. **R. suffruticulosa**, Linn. Half-shrubby Wild Mignonette. E. B. 2628, L. C. 127. Stems woody at the base, stout, round, hollow, with five more or less prominent angles. Leaves *pinnatifid, with linear, wavy, toothed lobes*. *Sepals five, linear-lanceolate*. Petals three-cleft; segments linear. Fruit bluntly three-angled, *with three slightly spreading beaks*, densely granulate, with crystalline granules. Here and there, on rubbish, South of England. Annual or biennial. July.

Var. *R. alba*, Linn. White Wild Mignonette. Stem round, hollow, erect, straight, without prominent angles. Leaves pinnatifid; lobes linear-lanceolate, toothed or lobed; segments more numerous than in *R. suffruticulosa*. Sepals six, lanceolate-linear. Petals three-cleft, segments not laciniated as in the preceding. Near Settle, Yorkshire. Annual (?). August.

ORDER CII.—**DROSERACEÆ**, D. C. THE SUNDEW FAMILY.

Herbaceous plants, with alternate leaves, which are circinate in prefoliation, and furnished with glandular hairs and fringes. Sepals and petals five respectively. Stamens withering, either equal in number to the petals, and alternate with them, or some multiple of the petals. Ovary simple, with three-five styles. Capsules with from three to five valves, and loculicidal dehiscence.

SYNOPSIS OF THE GENERA.

Parnassia. Flowers solitary, large.

Drosera. Flowers small, in terminal clusters.

I. *Parnassia*, Linn. Grass of Parnassus. Stems erect, bearing a single leaf. Leaves mostly radical, cordate-ovate, leathery, in a rosette. Flowers large, solitary, terminal. Sepals five, slightly attached to each other at the base; petals and stamens five, with five scales, fringed with glandular *setæ*. Stigmas four, nearly sessile. Capsule one-celled, four-valved.

P. palustris, Linn. Grass of Parnassus. E. B. 82, L. C. 436. Stems erect, simple, angular, smooth. Leaves cordate-ovate; the lower petioled, the upper sessile, amplexicaule. Flowers solitary. Sepals blunt, striated. Petals large, white, veined, much longer than the calyx. Stamens reflexed, glands of the scales spreading. Boggy places, especially in the north of England and Scotland. Perennial. August.

A. 16, C. 60. Lat. 50°—61°. Alt. 0—900 yards. T. 50°—38°.

II. *Drosera*, Linn. Sundew. Stems often wanting. Leaves undivided or lobed only. Flowers on scapes, terminal, racemose, rarely solitary. Whole plant furnished with glandular viscid hairs. Calyx in five or more deep, permanent segments. Petals five or more, with claws. Stamens five-ten, with small roundish anthers. Ovary roundish, with from five-eight styles. Stigmas club-shaped. Fruit capsular, ovate, one-celled, three- or four-valved. Seeds numerous.

1. *D. rotundifolia*, Linn. Round-leaved Sundew. E. B. 867, L. C. 138. Stems erect, springing from the centre of a leafy rosette, which they much surpass. Leaves close to the ground, with a roundish limb, abruptly tapering into a petiole. Fruit erect, on short pedicels, in a one-sided, elongated, terminal cluster. Seeds tapering

(fusiform), elongate, with a loose, reticulate testa. Boggy heaths. Perennial. July.

A. 18, C. 80. Lat. 50° — 61° . Alt. 0—700 yards. T. 52° — 40° .

2. **D. intermedia**, Hayn. *D. longifolia*, Linn. and Sm. Narrow-leaved Sundew. L. C. 139. Leaves *obovate* or *obovate-oblong*, *tapering into petioles*, not fringed as the above, *erect*. Boggy heaths. Walton Heath, Surrey (Walton-on-Thames). Perennial. July.

A. 13, C. 4. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 40° .

Var. *caulescens*. (See "Phytologist," vol. ii., p. 27.) Caulescent forms of this *Drosera* appear to have been forgotten by writers on British plants, during the present century. Attention has been called to it by the Rev. W. M. Hind, as above.

3. **D. anglica**, Huds. Great Sundew. E. B. 869, L. C. 140. Leaves erect, linear-oblong, obtuse, or truncate at the apex, on longer stalks, and broader than those of *D. intermedia*; hairs red, very long and glandular. Flower-stalks as long as the leaves. Seed oblong, with a lax, reticulated, or tubercled coating. North of England and Scotland; Norfolk (?). Perennial. July.

A. 14, C. 40. Lat. 50° — 58° . Alt. 0—200 yards. T. 52° — 47° .

Var. *β. obovata*, Mert. and Koch. Limb of the leaf rather obovate than linear-oblong. Capsule often almost abortive, shorter than the calyx.

This plant grows in Braemar; and the altitude of the lowland part of that highland district is estimated by Mr. Barton (see "Phytologist," N. S., vol. ii., p. 308) between 1000 and 1500 feet high. According to this estimate, the upper limit of *D. anglica* should be extended to 500 yards.

ORDER CIII.—**HYPERICACEÆ**, D. C. THE TUTSAN FAMILY.

Herbaceous plants, shrubs or trees. Leaves entire, usually opposite. Sepals four-five, either distinct or more or less covering. Petals just as many as the sepals, twisted in prefloration. Stamens indefinite, in three or more parcels. Anthers versatile. Ovary simple, with several cells and a central placenta. Styles several, with simple, occasionally capitate stigmas. Fruit either capsular or baccate, rarely one-celled, multivalvular. Seeds minute indefinite. Embryo straight, without albumen. Radicle towards the hilum.

Hypericum, Linn. St. John's-wort. Herbaceous plants or shrubs, with opposite, simple, entire leaves, which are usually furnished with pellucid dots (reservoirs of essential oil). Sepals five, free or united at the base, ovate, slightly unequal, permanent. Petals as many as the sepals, obtuse, spreading. Stamens indefinite, combined at the base into three or five sets, with small roundish anthers. Ovary with three-five cells or carpels and as many styles, with simple stigmas. Fruit capsular, rarely baccate, three-five-celled, with numerous seeds.

SECT. I.—Stems herbaceous. Stamens in three parcels (triadelphous). Styles three. Capsule three-celled, three-valved.

§ 1. Sepals without glandular serratures.

1. **H. perforatum**, Linn. Perforated St. John's-wort. E. B. 295, L. C. 215. Stems erect or ascending, glabrous, reddish, with two prominent lines, branching. Leaves elliptic-oblong, with transparent* (pellucid) nerves and pellucid dots (punctures). Flowers numerous, paniced. Sepals lanceolate, pointed. Petals twice as long as the sepals. Ovary about as long as the sepals. Dry places. Perennial. July—September.

A. 16, C. 80. Lat. 50°—61°. Alt. 0—200 yards. T. 52°—46°.

Var. **β. angustifolium**. Leaves linear elliptical, with large pellucid punctures. Sepals lanceolate, denticulate, rather longer than the ovary. This is the common form in dry, chalky places.

Note.—The comital area or census of this plant is far from general. In walking through several counties in the centre of Scotland no example of this occurred.

2. **H. quadrangulum**, Linn. *H. tetrapterum*, Fr. Square-stalked St. John's-wort. E. B. 370, L. C. 217. Root creeping. Stems erect or ascending, branching, glabrous, four-angled, with four very prominent wings. Leaves ovate-oblong, sessile, with numerous small pellucid dots. Flowers in compact panicles, sometimes spreading. Sepals lanceolate, acuminate, ribbed. Petals longer than the calyx, ribbed or striated. Fruit more or less triangular, with blunt angles, ovate at the base, smooth, striated. Watery places. Perennial. July, August.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—46°.

Does not this species grow commonly in more counties than *H. perforatum*?

3. **H. dubium**, Leers. *H. quadrangulare*, Linn. Imperforate St. John's-wort. E. B. 296, L. C. 216. Stems erect, glabrous, usually branching, with four more or less elevated lines. Leaves ovate-oblong, blunt, with few pellucid dots, the secondary nerves



Fig. 198.—*Hypericum perforatum* (?). 1, Flower entire; 2, one of the bundles of stamens; 5, capsule, opening with three valves; 6, seed entire; 7, section of the seed.

* These dots are commonly called transparent, but pellucid would be the better term. Objects cannot be seen through them, but the light can (perlucet, the light passes or shines through them).

pellucid and anastomosing. Flowers in close terminal panicles. Sepals shorter than the corolla, *blunt* or pointed, toothed at the apex. Petals elliptical, with black streaks. Capsule ovate-acuminate,



Fig. 198.—*Hypericum perforatum* (?). 3, Pistil and calyx; 4, transverse section of the ovary.

wrinkled longitudinally. Styles stout, nearly as long as the ovary. Moist grassy places; in woods and shady places. Mountainous parts. Perennial. July—September.

A. 15, C. 50. Lat. 50° — 57° . Alt. 0—300 yards. T. 51° — 45° .

4. ***H. humifusum***, Linn. Trailing St. John's-wort. E. B. 1266, L. C. 218. Stems very slender, *prostrate*, rarely somewhat erect. Leaves oblong, with slightly pellucid dots. Flowers nearly solitary and terminal, or in few-flowered racemes. Sepals oblong, obtuse, or with a slight mucro (point). Capsule bluntly triangular. This is distinguished from the other species by its prostrate habit. It comes near to No. 5, but is not shrubby like that. Moist pastures. Perennial. June—September.

A. 16, C. 75. Lat. 50° — 58° . Alt. 0—150 yards. T. 52° — 46° .

In Scotland it probably grows at a greater elevation than that above stated.

5. ***H. linariaefolium***,* Vahl. Toad-Flax-leaved St. John's-wort. E. B. 2851, L. C. 219. Stems several from the same root, woody, round, tapering, leafy, nearly cylindrical. Leaves linear, with revolute margins and blunt tips, opposite. Flowers cymose. Sepals ovate-tapering, with glandular margins, and scattered black glands externally. Petals yellow, glandular at the tips. Capsule ovate, acuminate, ribbed. South of England. Devon. Perennial. June—September (?).

A. 1, C. 2. Lat. 50° — 51° . Alt. ? T. 52° .

This plant is like *H. humifusum* in habit, but is rather larger and far more rigid.

§ 2. Stems round. Sepals with ciliary glands.

6. ***H. pulchrum***, Linn. Elegant St. John's-wort. E. B. 1227, L. C. 220. Stems erect, bent at the base, round, glabrous, simple or branching. Leaves ovate, clasping, coriaceous, smooth, with numerous translucent dots. Flowers in opposite paniced cymes. Sepals obovate, roundish, with a point, ciliated, with nearly sessile glands. Petals oblong, ribbed, with black sessile glands. Commons; hedges and dry bushy places. Perennial.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—750 yards. T. 52° — 40° .

* The specific name of this plant is variously spelled, viz., *linarifolium*, *linariifolium*, and *linearifolium*. If its name be derived from the shape of its leaves it should be *linariaefolium* (linaria-leaved).

7. **H. montanum**, Linn. Mountain St. John's-wort. E. B. 371, L. C. 222. Stems erect, round, simple, *smooth*. Leaves *oblong or ovate-oblong, sessile*, with transparent veins, translucent dots, and bordered by glandular fringes. Flowers in a *dense terminal corymb*. Sepals linear-lanceolate, *fringed with strong stipitate black glands*. Shady places; on chalky or sandy places. A very elegant plant. Perennial. June, July.

A. 12, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 50°—47°.

8. **H. hirsutum**, Linn. Hairy-stalked St. John's-wort. E. B. 1156, L. C. 221. Stems erect, simple or slightly branched, *hairy, almost hoary*. Leaves ovate or oblong, on short petioles, or sessile, with prominent nerves and numerous pellucid dots. Flowers in a narrow panicle. Sepals lanceolate-linear, fringed with black, shortly stipitate glands. Woods, hedges, and shady places. Perennial. July.

A. 15, C. 60. Lat. 50°—58°. Alt. 0—150 yards. T. 51°—46° (45°?).

H. barbatum, Jacq. Bearded St. John's-wort. E. B. 1987, L. C. Excluded Species. Stems erect, with two very slightly elevated lines. Leaves oblong, with numerous black dots and pellucid punctures. Sepals ovate, pointed, strongly fringed, with numerous black dots. Petals strongly ribbed and dotted. Styles longer than the ovary. Aberdalgie, Perthshire. Mr. G. Don. Perennial. July.

SECT. II.—Stem shrubby; styles three; capsule baccate.

9. **H. Androsæmum**, Linn. Tutsan. Curtis, Fl. Lond. 164, L. C. 214. Stems ligneous at the base, glabrous, erect, or ascending, simple or branching, with two prominent lines. Leaves ovate, blunt, broad, glabrous, glaucous underneath, without glands. Flowers corymbose. Petals yellow, with a tinge of red. Fruit baccate, black. Sepals ovate, *enlarged after flowering*. Stamens *scarcely half as long as the petals*. Shady places. Perennial. June—August.

A. 15, C. 50. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—46°.

H. anglicum, Bertol. E. B. 1225. Sepals broad, unequal, half as long as the petals. Styles exceeding the stamens. Capsule ovate. (See "Phytologist," N. S., vol. i., p. 117.)

H. hircinum, Sibth. Fl. Gr. 773. Goat-smelling St. John's-wort. Stems erect, branched with angular branches (both stems and branches are winged). Leaves ovate or ovate-lanceolate, more or less glaucous, with a goatish smell, especially when bruised; hence the name. Peduncles one-three-flowered, shorter than the leaves, with two rudimentary bracts. Pedicels longer than the calyx. Sepals ovate-lanceolate, *acute*, entire, not half as long as the petals, not dilated, as in *H. Androsæmum*. Stamens considerably longer than the petals. Capsule smooth, opening at the apex.

This plant has been observed in Yorkshire, near Settle. It has been received from Lancashire and Cornwall.

SECT. III.—Stem shrubby; styles five.

10. **H. calycinum**, Linn. Large-flowered St. John's-wort.

E. B. 2017, L. C. Excluded Species. Stems woody, procumbent, branching, leafy. Young branches smooth, round. Leaves leathery, ovate, elliptical, tapering at both ends, quite entire, glaucous below. Peduncles bracteate. Flowers terminal, solitary. Sepals obovate, leathery, membranous, spreading; petals large, tapering into a long, concave claw. Naturalized in woods and hedges, &c. Probably not an original native. (How many of our species are original, and how many are introduced?) The following are fair localities:—Dorking great chalk quarry, near Denbies; in a dense wood between Ryde and the ruins of Quarr Abbey; in a hedge at Shalford, near Guildford, Surrey. In Ireland and Scotland it is said to be more plentiful than in England. It is a very ornamental plant, and where it obtains a footing it maintains its ground. Perennial. July—September.

SECT. IV.—Stamens not numerous. Fruit capsular, one-celled, three-valved.

11. **H. elodes**, Linn. Marsh St. John's-wort. E. B. 109, L. C. 223. Aquatic stoloniferous plants. Stems *procumbent*, *rooting*, erect above, without prominent lines. Leaves ovate, roundish, slightly cordate at the base. Divisions of the calyx ovate, bordered with glandular fringes. Turfy bogs. Perennial. June—August.

A. 14, C. 40. Lat. 50°—60°. Alt. 0—350 yards. T. 52°—45°.

†† Placentation axile, or central (p. 149).

Pyrolaceæ are known by their erect, simple stems, round, leathery leaves, and neat flowers; *Monotropaceæ*, succulent, leafless plants, with terminal clusters of pale yellow flowers; *Celastraceæ*, a small order of shrubs or low trees, readily distinguished, in autumn, by the rich scarlet aril of the fruit and the crimson-coloured lining of the cell; *Aceraceæ*, an order of trees known by their lobed leaves, pendulous flowers, and keyed fruit; *Polygalaceæ*, by their crested petals, connected stamens, and compressed ovary; *Tiliaceæ*, an order of trees with broad, cordate, petiolate leaves, and sweet-smelling, pendulous flowers; *Malvaceæ*, by their monadelphous stamens, and, in the British species, by the whorled ovaries; *Geraniaceæ*, by the swollen-jointed stems, clawed petals, and beaked fruit; *Balsaminaceæ*, by their succulent habit, unsymmetrical flowers, and elastic, capsular valves; *Oxalidaceæ*, by their compound, ternate leaves, and conspicuous, regular flowers; *Elatinaceæ*, by their minute size, aquatic habitats, and inconspicuous flowers; *Linaceæ*, by their simple, entire leaves and regular conspicuous flowers; *Caryophyllaceæ*, by their opposite, connate leaves (by the union of the sepals in a tube), by the clawed petals, and stipitate ovary; *Frankeniaceæ*, by the branching stems and sheathing leaves; *Tamaricaceæ*, the British species, by the minute, appressed, scale-like leaves, and inconspicuous, axillary, spicate flowers; *Berberidaceæ*, by their arborescent habit and baccate fruit; *Ranunculaceæ*, by their sheathing petioles, polycarpous fruit and acrid properties.

corolla. Stigma *annular, five-lobed* (with five erect points). On open, elevated, heathy places in the north. Not rare in Scotland. Perennial. June, July.

A. 11, C. 25. Lat. 52° — 61° . Alt. 0—600 yards. T. 48° — 40° .

3. **P. rotundifolia**, Linn. Larger Winter-Green. E. B. 213, L. C. 707. Leaves large, round, slightly and remotely toothed, some of them with a very slight point. Flowers large, spreading, *pendulous*, on *pedicels longer than the bracts*. Petals large, white, ovate. Style *considerably longer than the petals*, with an annular enlargement. Stigma stellate, with five blunt rays. In woods; rarer than the preceding. Perennial. July, August.

Note.—In this species or form the leaves are pointed, or slightly pointed, the panicle is laxer, and the style always considerably longer than in *P. media*. *P. minor* has denser or less lax panicles than either of the two, with which it can be confounded. Its stems are generally taller than those of *P. media*, but usually shorter than the stems of *P. rotundifolia*. (See "Phytologist," vol. i., p. 296.)

A. 6, C. 12. Lat. 52°—58°. Alt. 0—800 yards. T. 49°—39°.

Var. *arenaria*, a maritime form of this species, is distinguished from the typical form by the more numerous bracts on its stem. Lancashire and Yorkshire coasts.

4. ***P. secunda***, Linn. Serrated Winter-Green. E. B. 517, L. C. 710. Stem *branched*, rather more woody than in the preceding species, *leafy*, bearing a *slender cluster* of white, drooping, *unilateral flowers*. Leaves *ovate, serrated*. Segments of the calyx triangular, rounded, minutely jagged, or downy at the margin. Petals very much longer than the calyx, convergent. Stamens equally incurved. Style *long, much exerted, not much enlarged at the apex*. Stigma with five radiating lobes. In alpine mossy woods. Perennial. June (?), July.

A. 7, C. 12. Lat. 54°—58°. Alt. 0—650 yards. T. 47°—40°.

Note.—This is a very distinct species, not liable to be confounded as Nos. 1, 2, 3 are.

II. ***Monesis***, Salisb. Stems erect, one-flowered, with a few roundish, toothed leaves. Petals slightly connected at the base. Filaments subulate; anthers with two tubular pores at the base of the anther-lobes. Stigma five-parted. Capsule five-celled, five-valved, *opening from the apex*. Margins of the capsular valves not webbed.

M. grandiflora, Salisb. *P. uniflora*, Linn. Single-flowered Winter-Green. E. B. 146, L. C. 711. Stems only two-three inches long, reclining, densely leafy. Leaves ovate, roundish. Flower-stalk three inches long, with a concave bract, and a large, solitary flower. Stamens shorter than the petals. Anthers turgid, inflexed, with tubular appendages at the base. Scotland. Perennial. July.

A. 3, C. 8. Lat. 56°—58°. Alt. 0—100 yards. T. 47°—46°.

See 27. John Sims added a.

ORDER. CV.—**MONOTROPACEÆ**, Nutt. THE FIR-RAPE FAMILY.

Parasitical (?) leafless plants. These are easily distinguished from *Pyrolaceæ* by their succulent habit; also by their straight, not declinate, style, and by the longitudinal dehiscence of their anthers.

Monotropa. Birds'-nest. Parasitic (?) plants, with simple, scaly stems. Flowers racemose, Perianth single, in eight-ten pieces. Stamens eight-ten, with kidney-shaped, one-celled anthers. Ovary ovate, with four or five furrows with as many cells. Style short,

erect, with an orbicular, peltate stigma. Fruit capsular, four- or five-celled, four-five-valved, with a dissepiment from the centre of each, and with a spongy, central column, with numerous minute, tunicated seeds.

M. hypopitys, Linn. Fir-Tree Birds'-nest. E. B. 69, L. C. 712. Roots scaly, fleshy, with matted fibres. Stem four-six inches high, erect, simple, with ovate or oblong appressed scales. Flowers several, drooping, in a terminal cluster. Petals ciliated. Capsule ovate. Woods; rare. Perennial. June—August.

A. 12, C. 30. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

ORDER CVI.—**CELASTRACEÆ**, Br. THE SPINDLE-TREE FAMILY.

Shrubs, with simple leaves and axillary cymous flowers. Sepals four or five, inserted into an expanded torus. Petals four-five, inserted by a broad base. Stamens alternate with the petals. Ovary immersed in the disk (torus), with three or four cells, each containing one or several seeds. Fruit capsular, with septiferous valves (bearing the partitions). Seeds one, or several, in each cell.

SYNOPSIS OF THE GENERA.

Euonymus. Leaves simple; calyx flat, four-five-lobed; petals four-five; capsule three-five-celled.

Staphylea. Leaves compound; calyx five-parted; capsule membranous.

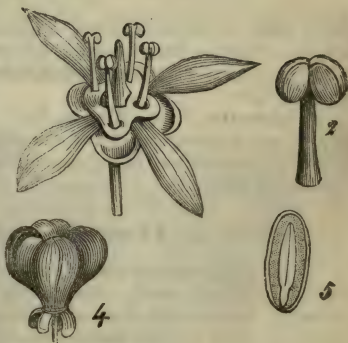


Fig. 199.—*Euonymus europæus*. 1, Entire flower; 2, stamen; 4, fruit; 5, section of seed.

I. **Euonymus**, Linn.

Spindle-Tree. Shrubs, with hard wood, opposite branches, and opposite, stalked, simple, smooth leaves. Flowers axillary, on forked peduncles. Calyx monosepalous, permanent, in five deep segments. Petals five, flat, spreading. Stamens four-five, distant, attached to both ovary and receptacle. Ovary with three-four-five lobes, and as many cells, one short style and obtuse stigma. Capsule valvular, coloured, with a single arillate seed in each cell.

E. europæus, Linn. Spindle-Tree. E. B. 362, L. C. 245. Small tree, much branched; bark of the recent branches smooth and green. Leaves glabrous, oblong, acuminate, finely toothed. Flowers small, in axillary cymes. Calyx spreading or reflexed. Petals oblong. Capsules rosy-red when mature, with three-four, rarely five,

obtuse lobes. Seeds white, enveloped in a fleshy orange-red aril. Hedges, &c. Tree. Flowers, May. Fruit, September.

A. 14, C. 40. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

Note.—Skewers are usually made of the wood of this tree. (See Loudon, Arb., 497.)

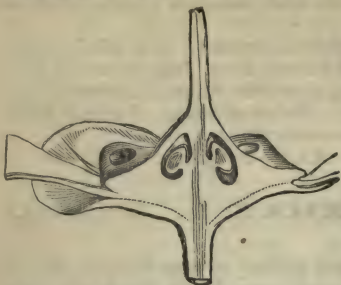


Fig. 199.—*Euonymus europæus*. Section of pistil and disk.

three erect styles and obtuse stigmas. Capsules two-three-celled, inflated, bladder-like, cohering by their sutures, where they burst. Seeds few (usually two) in each capsule, with a large scar, and oblique, lateral point.

S. pinnata, Linn. Bladder-Nut. E. B. 1560, L. C. p. 15. A small tree. Leaves pinnate, in five-seven pairs. Flowers in racemes. Fruit inflated, membranous, two-three-celled. Often planted in shrubberies. Flowers, June.

ORDER CVII.—**ACERACEÆ**, D. C. THE MAPLE FAMILY.

Trees, with aqueous saccharine sap. Leaves simple, exstipulate, lobed, rarely compound. Flowers in axillary corymbs or pendulous racemes. Calyx with four-nine lobes, and an annular thick disk. Petals as many as the calyx-lobes, inserted round the hypogynous disk. Stamens on the same disk, definite, usually eight. Ovary two-lobed. Style one, with two stigmas. Fruit a samara, separating into two indehiscent, one-two-seeded, winged carpels. Seed ascending, without albumen. Embryo plicate. Radicle near the hilum.

Acer, Linn. Maple. Trees or shrubs, with opposite branches, and lobed, stalked, smooth leaves. Flowers in racemes, upright, or drooping. Calyx flat at the base, with five or more deep, acute, permanent segments. Petals equal to and alternate with the segments of the calyx. Stamens seven-nine, with peltate, two-lobed anthers. Ovary two-lobed, compressed, with a cylindrical style, and two or three pointed, revolute stigmas. Capsules as many as the stigmas, combined at the base, compressed, ending in a rounded, firm, membranous wing. Carpels woolly on the inner side. Seeds one-two in each cell.

1. **A. campestre**, Linn. Field Maple. E. B. 304, L. C. 225. Small tree, or large, branching shrub. Leaves *palmate*, *five-lobed*,

the middle and larger lateral lobes often three-lobed, with blunt segments. Flowers green, in erect, branching corymbs. Petals rather narrower than the sepals. Fruit downy, with broad, spreading wings. Hedges. June.

A. 10, C. 40. Lat. 50°—55°. Alt. 0—200 yards. T. 52°—47°.

2. **A. Pseudo-platanus**, Linn. Sycamore. E. B. 303, L. C. 226. A more or less lofty tree, with five-lobed, serrated, or toothed leaves. Flowers in long, pendulous, panicked clusters. Fruit rather glabrous, with spreading wings, narrowed at the base. In plantations. May. This tree grows in woods in several parts of Scotland, and in plantations in England. About Taymouth there are some gigantic examples of the Plane-tree, as it is there commonly called. Some huge trees of the Field or Hedge *Maple* occur also in Scotland, where it is uniformly a tree, and never a hedge-shrub (?). At Blairlogie, in Stirlingshire, there is a *Maple* (*A. campestre*) fifty-five feet high, with a trunk four feet in diameter at the base, and the circumference of its top is about fifty yards. At Callander, in Perthshire, there are fine specimens of this tree. (Compare Loudon's "Arboretum," pp. 416—430.)

ORDER CVIII.—**POLYGALACEÆ**, Juss. THE MILK-WORT FAMILY.

Shrubs or herbaceous plants. Leaves simple, and usually alternate. Flowers in spiked terminal racemes. Sepals five, irregular. Petals three; one of which is larger than the other two, and forms the keel, which is often crested. Stamens eight, with monadelphous or diadelphous filaments. Anthers one-celled, opening by terminal pores. Ovary two-three-celled, with solitary ovules and single style. Fruit capsular, with one-three one-seeded cells, dehiscence loculicidal. Seed crowned. Albumen fleshy. Radicle towards the hilum.

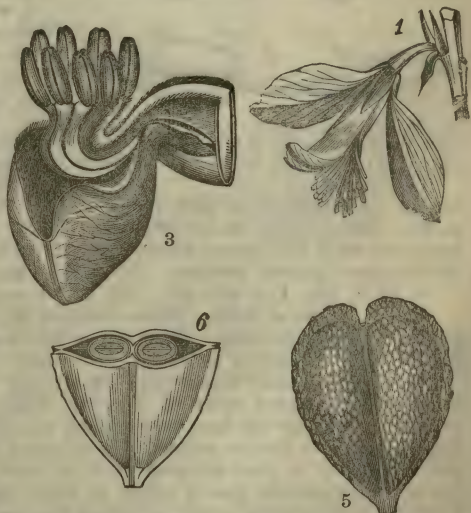


Fig. 200.—*Polygala vulgaris*. 1, Entire flower, magnified; 3, the keel and the stamens, in two parcels; 5, the entire capsule; 6, horizontal section of the same.

Polygala, Linn. Milkwort. Leaves entire. Flowers in clusters. Calyx with five sepals, the three outer small, the two inner

larger and coloured. Petals variable in number, slightly combined with the filaments and with each other, irregular, the lowermost keel-shaped, generally crested with a many-cleft appendage. Stamens united by their filaments, and divided into two sets of four in each. Ovary roundish, with a club-shaped, straight style, and two-lipped concave stigma. Capsule compressed, two-valved and two-celled, with solitary pendulous seeds. Seeds downy, with a four-pointed caruncle at the base.

1. **P. vulgaris**, Linn. Common Milkwort. E. B. 76, L. C. 141. Stems reclining and shrubby at the base, ascending or erect, leafy. Lower leaves *oblong* or *obovate*, attenuated at the base, scattered; upper ones linear-lanceolate, alternate.

Flowers blue or pink, rarely white. Wings (the two inner sepals) oblong, with three nerves, the middle nerve anastomosing copiously with the lateral nerves; lateral nerves ramifying. Dry or wet grassy places; common. Perennial. May—July.

A. 18, C. 82. Lat. 50°—60°. Alt. 0—900 yards. T. 51°—38°.

Var. *P. oxyptera*, Rehb. Narrow-winged Milkwort. E. B. 2827. Leaves narrow, lanceolate. Calyx-wings narrower than in the type. Flowers and fruit mostly unilateral. Guernsey.

Var. *P. depressa*, Wenderoth. Spreading Milkwort. Lower leaves nearly opposite, never in a rosette, oblong or oblong-obovate, attenuated towards the base, very minute, usually decaying and falling off before the flowers appear. Upper leaves alternate, increasing proportionately to their distance from the base, oblong or oblong-linear. Flowers pale blue or white, in short clusters of six-twelve flowers. Calyx-wings oblong or elliptical, attenuated at the base, and with a short, abrupt, blunt tip; central nerve strong, the two lateral nerves anastomosing, and much ramified. Capsule obcordate, winged, slightly granulate. Dry pastures. Down, Ireland. Perennial. May—July.

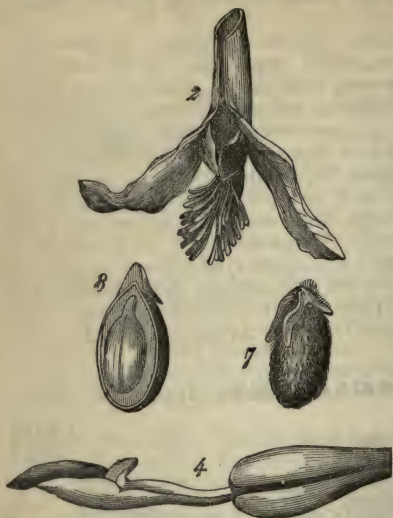


Fig. 200.—*Polygala vulgaris*. 2, Corolla detached, showing the connection of the petals and crested keel-petal; 4, the pistil; 7, seed entire; 8, section of seed.

P. calcarea, Schultz. *P. amara*, Don. E. B. 2746, L. C. 141*. Stems ascending. Lower leaves and leaves of the barren shoots obovate, blunt, sometimes spatulate, tapering into short flattish footstalks. Flowers deep blue (?), drooping, on short pedicels. Bracts three, coloured, the central one oblong, the two lateral lanceolate; lateral wings (calyx) large, oblong or obovate, rounded, narrowing towards the base, and with a short, broad point. Common on the chalky downs of the South of England. Perennial. May, June.

2. *P. austriaca*, Crantz. *P. uliginosa*, Rchb. Bog Milkwort. Rchb. Pl. Crit., i. 21. Stems herbaceous, with a terminal raceme of flowers. Lower and root-leaves obovate, obtuse, in a rosette; stem-leaves oblong-elliptical, much smaller than the root-leaves. Calyx-wings oblong or ovate, blunt, with simple or slightly branched nerves. Capsule broader than the wings, roundish, cuneate. Perennial. June (?).

Var. *α*. Leaves of the rosette larger than the leaves of the *branching stem*; flowers smaller than in var. *β*; capsule rounded at the base.

Var. *β*. Stem nearly simple; flower-shoot almost constantly simple; flowers large; capsule cuneate. This is the only form as yet seen in Cronkley Fell, Yorkshire.

ORDER CIX.—TILIACEÆ, Juss. THE LINDEN OR LIME-TREE FAMILY.

Trees or shrubs. Leaves simple, stipulate, toothed, alternate. Flowers axillary. Sepals and petals four-five. Stamens distinct, usually indefinite. Ovary with two-ten, mostly united carpels. Style one, with as many stigmas as carpels. Fruit many- or one-celled by abortion, dry or pulpy. Seeds one-two or many.

Tilia, Linn. Lime-Tree. Usually lofty trees, with alternate, spreading branches, and stalked, cordate acute, serrated leaves, and paniced fragrant flowers. Calyx five-parted, or with five sepals. Petals five, obovate, obtuse, somewhat notched at the apex. Stamens indefinite, free, with rounded anthers. Ovary five-celled, roundish, with an erect, deciduous style, and a five-obtusely-angled stigma. Fruit roundish, capsular, imperfectly five-celled (one-celled by disruption of the partitions), one-two-seeded. Seeds globular and smooth.

1. *T. europæa*, Linn. *T. intermedia*, D. C. (?) Common



Fig. 201.—*Tilia grandifolia*, Ehrh.
A branch in flower.

Lime-Tree. E. B. 610, L. C. 212. Leaves unequally cordate, entire at the base, pointed, shining on both sides; petioles about half as long as their leaves. Cymes of flowers three-six. Fruit downy, globular,

crowned by the long, straight, nearly smooth style. In plantations, parks, and pleasure-grounds. A common avenue- or lawn-tree. Flowers in June and July.

2. *T. parvifolia*, Ehrh. Small-leaved Lime-Tree. E. B. 1705, L. C. 211. Leaves cordate at the base, roundish, abruptly acuminate, closely serrated with ovate sharp teeth, on long slender petioles, dark green above, glaucous below, quite smooth, except in the lower part of the under surface, where the angles formed by the nerves and midrib are densely shaggy with ferruginous, short, woolly hairs. Peduncles slender, about two- or three-flowered. Sepals downy. Fruit woolly. Distinguished from *T. europæa* by its smaller leaves. In woods. Flowers in August.

A. 8, C. 15. Lat. 50°—55°. Alt. 0—100 yards. T. 51°—47°.

Near Bewdley, in Worcestershire, there is a large wood, above 500 acres, remote from any dwelling or public

road, where the whole or greater part of the underwood is the Small-leaved Lime. (See "Phytologist," N. S., vol. i., p. 281.)

3. *T. grandifolia*, Ehrh. Large-leaved Lime-Tree. E. B. 2720, L. C. 213. A lofty tree. Leaves downy on their under surface. Peduncles one-three-flowered. Lobes of stigma usually erect. Flowers in July and August.

In the "Arboretum and Fruticetum Britannicum," these three species or forms or states are combined under the name *Tilia europæa*, the European or Common Lime-tree. Mr. Loudon maintained that all the known Lime-trees may be included under two species, *T. europæa* and *T. americana*. His view of our English or European Limes is as follows:—

T. europæa, Linn. "Leaves cordate, acuminate, serrated, smooth, except a tuft of hair at the origin of the veins (nerves or ribs), beneath, twice the length of the petioles. Cymes many-flowered. Petals without scales. Fruit coriaceous, downy."

The following, which rank as species according to De Candolle and other systematic botanists, Mr. Loudon terms races or varieties, viz.:—

T. microphylla (*T. parvifolia*, Ehrh.) "Leaves cordate, roundish, acuminate, sharply serrated, smooth above, glaucous and bearded be-



Fig. 201.—*Tilia grandifolia*, Ehrh. 2, A single flower; 3, section of the pistil, showing the hypogynous insertion of the stamens; 4, transverse section of ovary; 5, capsule. 2, 3, 4, magnified.

neath on the axils of the veins, as well as in hairy blotches. Petals without scales. Fruit rather globose, hardly ribbed, very thin and brittle."

T. plataphylla (*T. grandifolia*, Ehrh.) "Leaves shaped as in *T. microphylla*, but larger, and downy beneath; axis of the veins woolly. Cymes three-flowered. Petals without scales. Fruit woody, downy, turbinate (pear- or top-shaped), with five prominent angles." "This tree," it is added, "is about the same size as *T. europæa*, from which it is readily distinguished by its larger and and rougher leaves, also by its rougher bark, and hispid branches." In the work above quoted there are, in all, eight varieties of this tree named and described. In *T. americana* the leaves are stated to be more obliquely cordate than in *T. europæa* and its forms. The petals also have a scale at the base, which is not the case in the European species or states. In England, *T. americana* does not flower till the flowers of our common forms are decaying. In winter this species (*T. americana*) is recognized by the dark brown colour of the bark of the young shoots, and by the robust appearance of the trunk and branches.—"Arboretum and Fruticetum," vol. i., p. 373.

ORDER CX.—MALVACEÆ, Juss. THE MALLOW FAMILY.

Herbs, shrubs, or trees, with alternate, stipulate, more or less divided leaves. Flowers on axillary peduncles. Sepals five, rarely three or four, more or less united at the base. Petals as many as the sepals, with a twisted prefloration (æstivation). Stamens usually indefinite, connected by their filaments (monadelphous). Anthers one-celled, reniform, bursting transversely. Ovary formed by the union of several carpels around a common axis, either coherent or distinct. Styles as many as the carpels. Fruit capsular or baccate, with one- or many-seeded carpels. Seeds with a curved embryo and no albumen.

SYNOPSIS OF THE GENERA.

Malva. Outer calyx three-leaved.

Althæa. Outer calyx six-nine-cleft.

Lavatera. Outer calyx three-lobed.



Fig. 202.—*Malva sylvestris*. 1, Branch with leaves and flowers, reduced; 5, fruit and calyx; 7, an entire seed; 8, embryo detached from the fleshy endosperm.

I. **Malva**, Linn. Mallow. Herbaceous plants or shrubs, with

simple, often plaited and lobed leaves. Flowers either axillary or terminal. Calyx monosepalous, with three bracts (outer calyx) divided into five broad segments. Petals five, inversely heart-shaped,

attached by claws to the tube formed by the united stamens, twisted before expansion (æstivation). Stamens indefinite, with kidney-shaped anthers and united filaments. Ovary orbicular. Style cylindrical, surrounded by the combined filaments, with many stigmas. Fruit with as many carpels as there are stigmas, arranged about the columnar receptacle, one-celled and two-valved. Seeds kidney-shaped, one, rarely two or three in each carpel.

1. *M. moschata*, Linn. Musk Mallow. E. B. 754, L. C. 204. Stems erect or ascending, simple or branching, round, rigid, hairy. Root-leaves roundish, lobed, with crenulate segments; stem-leaves deeply divided, *palmate*, in three-five divisions, with secondary linear entire or incised lobes. Flowers large, in axillary tufts, on long, rigid

Fig. 202.—*Malva sylvestris*. 2, Entire flower, natural size; 3, section of the same; 4, reniform one-celled anther; 6, a single carpel.

peduncles. Bracts lanceolate-linear, pointed. Calyx large, lax, enveloping the fruit. Petals rosy-pink, widely notched. Carpels hairy, not reticulate. In woods and dry places. Perennial. July.

A. 16, C. 60. Lat. 50°—57°. Alt. 0—200 (300) yards. T. 52°—47°.

In North Wales and about Clent and Hagley, Worcestershire, there is a variety of the Musk Mallow not uncommon, with the upper leaves not palmate, and with linear lobes as in the usual state, but with lobed leaves resembling the root-leaves. Several plants had lobed and toothed upper leaves, some had them cleft, and some had all the forms, lobed, cleft, and palmate leaves on the same plant. It is the late-flowering examples that exhibit this variety. The plants flower before they have produced a long stem, and before the development of the deeply-divided leaves which accompany a tall stem. This was the Common Mallow, about Clent, and it grew on the very summit of the Clent Hills, which are at least three hundred yards high.

2. *M. sylvestris*, Linn. Common Mallow. E. B. 671, L. C. 205. Stems round, hairy, robust, reclining, diffuse or erect. Leaves



five-lobed, plicate, lobes ovate, toothed, lower ones five-seven-lobed; lobes short, blunt, broad, toothed or crenulate. *Flowers in axillary tufts (trusses)*, on long hairy pedicels, which are erect in fruit. Divisions of the calyx erect after flowering, not completely covering the fruit. Corolla purple-violet, veined, large, with deeply-notched petals. Carpels *strongly reticulate*. Roadsides, hedges, waste places. Perennial. June.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

3. *M. rotundifolia*, Linn. Round-leaved Dwarf Mallow. E. B. 1092, L. C. 206. Stems reclining or ascending, spreading, branched, more or less hairy. Leaves roundish, with five-seven slightly prominent lobes, margin toothed or crenate. Flowers in pairs or solitary, axillary, on long reflexed peduncles. Bracts of the calyx (calycule) lanceolate, shorter than the calyx. *Corolla pale rose-colour, twice as long as the calyx*. Carpels *pubescent*, not reticulate, *completely invested by the calyx*. At the foot of walls, roadsides, &c. Biennial or perennial. June.

A. 15, C. 60. Lat. 50°—58°. Alt. 0—100 yards. T. 52°—47°.

M. nicaensis, All. Italian Mallow. Rchb. Fl. Ger., v. 168. Stem procumbent or ascending, round, hairy, tubercular, with spreading branches. Pedicels short, two-four together. Calycule-bracts *ovate-lanceolate*. Calyx increasing slightly after flowering. Petals *about twice as long as the calyx*, ovate, notched. Carpels *glabrous*, or *slightly pubescent*, not toothed at the margin. Battersea and Wandsworth. Annual. July—October.

4. *M. borealis*, Wallm. *M. pusilla*, Sm. E. B. 241, L. C. Excluded Species. Stem stouter and smoother than in *M. rotundifolia*. Leaves larger and *more deeply lobed*. Petals very minute, *scarcely as long as the sepals*. Carpels reticulate-rugose, meeting each other with a toothed edge. Hythe, Kent. Hudson. "Not found since."—Babington. Annual. July (p?).

M. ambigua, Guss. Stem round, slender, branching, ascending or procumbent, flexuous, covered with short, white, rigid, stellate hairs. Leaves smaller than they are in *M. sylvestris*, three-five-lobed; the lobes, especially the middle one, are longer and narrower than in the former-mentioned species. Flowers few, on slender, hairy pedicels; lobes of the calyx ovate-acuminate, hairy. Petals scarcely double the size of the calyx-lobes. Fruit smooth, with an elongate central column. Wandsworth steam-boat pier. Annual. July—September.

M. parviflora, Linn. Jacq. Vind. 39. Stems rigid, firm, erect or arched, branching, round, smooth (hispid above), hollow, leafy. Leaves orbicular, cordate, with broad, blunt, crenulate lobes, on stout, elongate, hispid leaf-stalks. Peduncles slender, unequal, spreading. Bracts of the calycule linear, pointed. Calyx-lobes broad, mucronate, much developed when in fruit. Carpels strongly wrinkled across, with a prominent toothed margin. Wandsworth steam-boat pier. Annual. July, August.

M. microcarpa (p?). Rchb. Fl. Ger., v. 166. Desf. Stem round,

rough, with tubercles and rigid stellate hairs. Leaves on hairy leaf-stalks, with plicate pointed lobes. Flowers in pairs, with slender, hairy pedicels. Bracts of the calyx triangular. Calyx-lobes broad, with an abrupt point, ribbed and ciliate. Petals scarcely longer than the calyx-lobes, strongly notched. Tube of the stamens hairy. Fruit small, smooth at the bottom of the calycine cup, which is but little enlarged after flowering. Wandsworth, with the above. Annual. July—September.

II. *Althæa*, Linn. Mallow. Annual or perennial herbaceous or shrubby plants, with floral organs like those of *Malva*. Calycul six-nine bracts united at their base.

1. ***A. officinalis*, Linn.** Marsh Mallow. E. B. 147, L. C. 208. Roots large; stems erect, downy. Leaves *thick, densely covered with soft, short down*, ovate, angular or lobed, truncate, or slightly cordate at the base, with unequal crenules; the lower about five-, the upper three-lobed. Flowers pale rose-colour, usually in axillary tufts, contiguous. Divisions of the calyx ovate-pointed. Fruit downy. Salt marshes. Perennial. July—August.

A. 8, C. 15. Lat. 50°—56°. Alt. ? T. 51°—48°.

2. ***A. hirsuta*, Linn.** Rough Mallow. E. B. 2674, L. C. 209. Stems erect, ascending or spreading, *hairy, with long spreading hairs*. Leaves *palmate*, lobes five-three, oblong crenate, with awned or ciliated lanceolate bracts; root-leaves small, reniform, not palmate. Flowers rosy, solitary, axillary, on long pedicels. Divisions of the calyx and calycul (involucre) lanceolate fringed. Carpels glabrous, strongly wrinkled. Borders of fields. With *Salvia pratensis*, on the south margin of Cobham Park Wood, and in an adjoining field, near Cuxton, Kent. Annual. July. Naturalized only in this locality (?). Steam-boat pier, Wandsworth, but here very uncertain.

Alien.

III. *Lavatëra*, Linn. Tree Mallow. Trees or shrubs, densely downy. Leaves lobed, serrated, stalked. Inflorescence axillary. Involucre of three broad, deep, spreading segments. Calyx monosepalous, cleft, with five acute lobes. Petals five, of the same shape and attachment as in the foregoing malvaceous genera. Stamens and anthers as in *Malva*. Carpels as many as the stigmas, arranged about a columnar receptacle, each one-celled and two-valved, with solitary kidney-shaped seeds in each. Distinguished from the other above-mentioned *Mallows* by their arborescent habit and three-lobed involucre.

***L. arborea*, Linn.** Tree Mallow. E. B. 1841, L. C. 210. Root tapering, much branched, running deep into the ground. Stem two-three yards high, erect, stout, leafy. Leaves with five-seven crenate lobes, stalked, soft and flexible. Flowers pink. Isle of Wight; on cliffs. Not rare in cottage-gardens in North Wales, between Bangor and Conway. Biennial. July—October.

A. 6. Lat. 50°—56°. T. 52°—48°.

On ledges of the Elyange Stack, Pembrokeshire, South Wales, "Botanical Looker-out among the Wild Flowers of England and Wales," by Edwin Lees, F.L.S. In the very agreeable work above-mentioned there is a view of this singular rock, with representations of the Tree Mallow growing on its inaccessible projections.

L. cretica (?), Linn. Jacq. Vind. 41. Stems *herbaceous*, two-three feet high, erect or ascending, branching, leafy. Leaves glaucous, with whitish prominent nerves; the lower ones rounded, slightly lobed, truncate at the base; the upper ones with acute triangular lobes; all crenated or toothed. Calycul slightly shorter than the calyx, not enlarging much at maturity. Calyx-lobes abruptly pointed (acuminate), scarious. Carpels smooth, wrinkled, toothed at the margin, yellowish. Wandsworth steam-boat pier. Annual or biennial. July—September.

L. punctata (?), D. C. Rchb., v. 176. Stems herbaceous, erect, six-twentyfour inches high. Leaves pale green, *the upper ones hastate*, all crenulate or irregularly toothed. Calycul about equal to the calyx. Calyx-lobes acuminate, erect, connivent. Petals three times as long as the lobes of the calyx. Carpels wrinkled. With the above. Annual. July—September.

L. olbia, Linn. Rchb., v. 177. Stems slightly woody. Leaves hoary, as in most of the genus; the lower ones cordate, three-five-lobed, the upper hastate. Petals much longer than the calyx. Carpels *hairy*, yellowish when ripe, with an elongated axis terminating in a nipple-like point. At Wandsworth, with the preceding.

This species is shrubby, and said to be perennial on the shores of the Mediterranean. It is herbaceous here, and probably annual. July—October.

ORDER. CXI.—**GERANIACEÆ**, D. C. THE GERANIUM FAMILY.

Shrubs or herbaceous plants, with forked stems, separable at the tumid joints. Leaves alternate or opposite, with scarious or membranous stipules, petiolate, lobed, palmate, rarely pinnate. Flowers in pairs, solitary or numerous in the angle of the fork or opposite to the leaves, apparently axillary; peduncles bracteate. Sepals five, persistent, ribbed, more or less unequal, imbricated in prefloration. Petals five, rarely four by abortion, unguiculate, hypogynous or perigynous. Stamens usually monadelphous, twice or thrice as many as the petals. Ovary with five pieces adhering to an elongated axis, each one-celled and one-seeded. Styles five, cohering round the axis. Carpels five, each containing one seed, by abortion of one of the ovules, in a membranous pericarp; carpels, when ripe, separating at the base, and curling upwards, or otherwise, by the elasticity of the dorsal nerves, which cohere to the elongated indurated axis (beak). Embryo plicate. Radicle approaching the hilum.

SYNOPSIS OF THE GENERA.

Geranium. Stamens all antheriferous; carpels with a recurved awn.

Erodium. Two stamens only, fertile; five barren carpels, with a long, spirally-twisted awn.

I. *Geranium*, Linn. Crane's-bill. Herbage hairy or downy, rarely smooth. Upper leaves nearly sessile, variously parted. Flowers purple, rose- or lilac-coloured; pedicels unequally reflexed after flowering. Stamens ten, united by their filaments, the five opposite to the petals shorter than the other five, *all bearing anthers*. Carpels round, or nearly so, separating at the base with elasticity, the dorsal nerve forming a coil, and adhering by its upper extremity to the axis.



SECT. I.—Petals waved or obcordate, with a more or less bearded claw.

1. *G. phaeum*, Linn. Dusky Crane's-bill. E. B. 322, L. C. 229. Stems erect, round, tapering, hairy, with deflexed hairs. Leaves *broad, five-lobed*; lobes large, acute, cut or cleft, with large unequal teeth. Peduncles stout, spreading, hairy, with two equal pedicels. Flowers black or deep purple. Sepals with a short stout point. Petals not much longer than the sepals, with a wavy or crisp margin. Carpels hairy, *transversely wrinkled or plaited above*. Seeds punctate, striated. In woods. Perennial. May. *Woods Stone*

Var. Flowers white.

A. ? C. 15. Lat. 50°—55°.

2. *G. nodosum*, Linn. Knotted Crane's-bill. E. B. 1091, L. C. p. 15. Stems slender, rigid, angular, furrowed, *with swollen joints*, branching, leafy. Leaves on long foot-stalks, except the uppermost, which are shortly petiolate, three-cleft or five-cleft when the lateral lobes are cloven; lobes ovate acuminate, coarsely serrated or incised. Flowers in pairs, on slender peduncles; sepals lanceolate, ribbed, awned; petals twice as long as the sepals, obcordate, with notched lobes, all purple. Hertfordshire. Naturalized (?).

Alien.

3. *G. pratense*, Linn. Meadow Crane's-bill. E. B. 404, L. C. 231. Stems erect, round, downy, with *reddish knots*. Leaves five-

Fig. 203.—*Geranium dissectum*. 2, Stamens and pistil; 3, pistil; 4, section of the ovary; 5, fruit, composed of five shells (coques), two of them coiled up and raised to the top of the style.

seven-parted; divisions deeply incised, with unequal sharp lobes and teeth; lower ones petiolate, upper sessile. Flowers large, fine, deep blue-purple, with white and purple veins, in pairs; pedicels and calyx with glandular hairs. Sepals ribbed, with scarious-membranous margins, and short thick awns. Petals obovate or obcordate, with *short claws, thickly ciliated* above the claw. Stamens long, slender, greatly dilated at the base. Anthers deep purple. Fruit not wrinkled, hairy. Seeds punctate (dotted). In meadows. Perennial. June.

An uncommon plant in the south of England.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—600 yards. T. 51°—42°.

4. *G. sylvaticum*, Linn. Wood Crane's-bill. E. B. 121, L. C. 230. Stems erect, round, downy, *knots of the same colour as the Stem*. Leaves *five-seven-cleft; lobes incised, toothed, or coarsely serrated*, not cleft as in the preceding; the lower on long stalks, the upper nearly sessile. Flowers light reddish-purple, with crimson veins. Pedicels and calyx scarcely hairy, *not glandular*. Sepals ribbed and awned; awn longer and slenderer than in *G. pratense*. Petals tapering into a longish claw, which is *hairy all over, not ciliated*. Stamens fringed at the base. Fruit hairy about the keel. Seeds dotted. Woods and pastures, north of England. Perennial. June.

In many parts of Scotland this forms one of the most conspicuous ornaments of the woods and hedges.

A. 11, C. 30. Lat. 52°—60°. Alt. 0—850 yards. T. 47°—36°.

SECT. II.—Petals more or less notched or cleft, more or less bearded above the claw.

5. *G. sanguineum*, Linn. Red Crane's-bill. E. B. 272, L. C. 240. Root thick, horizontal, branching. Stems reclining or partly erect, spreading, with long, spreading hairs. Leaves deeply parted, in five-seven divisions, each division more or less cleft, *with two-three linear, entire, or incised lobes*. Peduncles one-flowered, often with an abortive peduncle. Sepals with a broad, scarious margin and *stout point*. Petals more or less notched, more than twice as long as the calyx, very fugacious. Carpels smooth, with long hairs only at the apex. Seeds finely punctured. Dry calcareous pastures. Perennial. June.

A. 16, C. 40. Lat. 50°—58°. Alt. 0—300 yards. T. 52°—44°.

Var. *erectum*. Stem erect.

Var. *prostratum*. Stem prostrate.

6. *G. columbinum*, Linn. Long-stalked Crane's-bill. E. B.



Fig. 208.—*Geranium* dissectum. 1, Flower entire; 6, the dotted seed; *a*, the hilum. 7, Embryo, all magnified.

259, L. C. 237. Stems ascending, with widely spreading branches, slightly downy, reddish. Leaves about five-parted; divisions three-cleft, with linear, entire, or incised, *divaricating* lobes. Peduncles *much longer than the leaves, bearing two flowers on unequal pedicels, the lower one reflexed*. Flowers purple, striated. Sepals slightly downy, *with very long points*. Petals not longer than the sepals. Fruit glabrous. Seeds strongly punctured. Chalky fields. Annual. June—September.

A. 16, C. 50. Lat. 50° — 57° . Alt. 0—200 yards. T. 51° — 48° .

7. ***G. pyrenaicum***, Linn. Perennial Dove's-foot Crane's-bill. E. B. 405, L. C. 232. Root thick, vertical, conical. Stems decumbent or ascending, downy; hairs short and spreading. Leaves palmate, in five-seven divisions; divisions more or less cleft, lobed, or toothed, *with narrow, reddish margins*; the lower leaves on long petioles, the upper on short ones, or nearly sessile. Flower-stalks longer than the floral-leaves. Flowers lilac-purple, very rarely white. Sepals with a very short, blunt tip. Petals *cleft, twice as long as the sepals*. Carpels soft, finely pubescent. Seeds smooth. Perennial. May. Battersea Fields, Mortlake, Chelsea.

A. 11, C. 20. Lat. 50° — 58° . Alt. 0—100 yards (250). T. 50° — 47° .

St. Leonard's Crag, Arthur Seat, Edinburgh. In this locality it is diminutive. *Abundant near Perth*

8. ***G. pusillum***, Linn. Small-flowered Crane's-bill. E. B. 385, L. C. 234. Stems spreading or erect, soft, with very short, spreading hairs. Leaves palmate, with five-seven divisions (lobes); lobes cleft; upper leaves nearly sessile. Peduncles about as long as the floral leaves, with minute herbaceous bracts. Flowers lilac. Sepals with short points, and furnished with spreading hairs. Petals notched or cleft, scarcely longer than the sepals. Carpels *clothed with soft, slightly appressed hairs*. Seeds smooth. Dry, gravelly places. Annual. May.

A. 16, C. 60. Lat. 50° — 58° . Alt. 0—200 yards. T. 51° — 47° .

9. ***G. molle***, Linn. Common Dove's-foot Crane's-bill. E. B. 778, L. C. 235. Root tapering, with strong fleshy fibres. Stems diffuse, prostrate or ascending, soft, with long, spreading, downy hairs. Leaves round, in five-seven deep lobes, each lobe subdivided into several rather broad rounded segments, shortly and abruptly pointed, the lower on long stalks, the upper nearly sessile. Flower-stalks longer than the contiguous leaves, spreading. Sepals hairy, with a short blunt point. Petals cleft, longer than the calyx. Fruit roundish, *wrinkled across, not hairy*. Seeds smooth. Cultivated and waste ground; very common. Annual. April.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—300 yards. T. 52° — 44° .

Nos. 8 and 9 may generally be distinguished as follows:—In *G. molle* the petals are rather obcordate than obovate; the notch is deeper and the colour is redder or more crimson than the colour of *G. pusillum*. The curious wrinkled, but not hairy, carpels afford the most reliable distinctive mark. Some botanists distinguish them by smelling. There is a faint, musky smell in No. 9, not perceptible, it is said, in *G. pusillum*.

SECT. III.—Petals entire, rounded at the tips, not hairy at the claw.

10. **G. rotundifolium**, Linn. Round-leaved Crane's-bill. E. B. 157, L. C. 233. Stems spreading or ascending, downy; hairs long, spreading, more or less glandulous. Leaves roundish, lobed, with five-seven crenulate or toothed lobes, *all, even the upper leaves, on long petioles*. Peduncles shorter than the petioles, with red, pointed bracts. Flowers rosy; sepals hairy, with short points. Petals entire, longer than the sepals. Fruit (carpels) subtended by the persistent filaments, *downy, delicately reticulate*. Seeds punctured. Hedges and roadsides. Annual. May.

Still grows about Battersea, Lavender Hill, and Wandsworth Rise.—A. I.

A. 5, C. 15. Lat. 50°—53°. Alt. 0—100 yards. T. 52°—48°.

11. **G. lucidum**, Linn. Shining-leaved Crane's-bill. E. B. 75, L. C. 238. Stems smooth, reddish, diffuse, spreading, ascending, or erect. Leaves five-seven cleft, with incised, crenulate lobes, all petiolate, *shining*. Peduncles *longer than the floral leaves*. Flowers rosy; three outer sepals broadly winged or prominently angled, with deep furrows and short transverse ridges, the two inner sepals scarious, with a herbaceous prominent nerve. Petals entire, longer than the sepals, with a long linear claw. Fruit hairy, *wrinkled* and punctured. Seeds punctured. Hedges and stony places; not frequent. Annual. June.

A. 17, C. 70. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—46°.

12. **G. robertianum**, Linn. Herb Robert. E. B. 1486, L. C. 239. Stems diffuse, ascending or erect, often reddish, hairy and glandular. Leaves *palmate, with three-five segments*, petioled. Peduncles longer than the leaves. Sepals awned. Petals entire. Carpels wrinkled. Seeds smooth. The whole plant is readily known by *its strong unpleasant odour*. Hedges, &c. Annual. April—October.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—550 yards. T. 52°—41°.

Var. *Raii*. **G. purpureum**. Vill. E. B. 2640. Leaves smaller, more shining and fleshy than in the type. The hairs on the calyx are glandular and short. In *G. robertianum* the hairs are long and without glands. The fruit in the variety is smooth, in the type downy.

G. striatum, Linn. Striated Geranium. "Bot. Mag." vol. ii., p. 55. Rehb. Fl. Ger. v. 196. Stem slender, round, leafy; upper leaves three-parted or deeply three-cleft, with sharp teeth, on short foot-stalks. Peduncles long, two-flowered; sepals awned and striated. Petals beautifully pencilled; anthers bluish. Cornwall. Observed at Trefriew, near Llanrwst, North Wales, well established. (See "Phytologist," N. S., vol i., p. 57.)

II. **Erodium**, Linn. Herit. Stork's-bill. Herbaceous plants, with opposite, stalked, pinnate or simple leaves, and membranous stipules. Flowers mostly umbellate. Sepals and petals as in *Geranium*. Stamens ten, united at the base, five perfect and five alternate, shorter and abortive (anthers on the longer filaments only).

Carpels five, each with one or two seeds and a long, internally bearded awn, which ultimately is spirally twisted and adherent to the top of the style.

1. **E. cicutarium**, Linn. Herit. Hemlock Stork's-bill. E. B. 1768, L. C. 228. Stems several, reclining, spreading, more or less hairy. Leaves pinnate; segments pinnatifid or with cleft lobes. Fertile stamens *enlarged at their base*. Fruit invested with appressed hairs. Sandy places. Annual. April—October.

A. 18, C. 20. Lat. 50°—59°. Alt. 0—100 yards. T. 52°—47°.

2. **E. moschatum**, Willd., Sm. Musk Crane's-bill. E. B. 902, L. C. 228*. Stems procumbent, ascending, stout, hairy. Leaves pinnate; leaflets ovate, unequally incised or toothed, sessile; *stipules ovate*. Fertile stamens *dilated and toothed at the base*. Peduncles many-flowered; pedicels swollen at the base. Carpels shaggy, with appressed hairs. The plant has a rather strong scent of musk. Waste places. Naturalized (?). July. *Near Limerick plentiful & truly wild* *Sm*

A. 9, C. 15. Lat. 50°—55°. Alt. 0—100 yards. T. 52°—48°.

3. **E. maritimum**, Sm. Sea Stork's-bill. E. B. 646, L. C. 227. Root tapering. Stems several, *quite prostrate*, three-nine inches long, branched, hairy, leafy. Leaves small (scarcely half an inch long), *cordate*, lobed; lobes notched, rough, hairs closely appressed. Flowers solitary or in pairs, on long peduncles. Petals pale red, minute or wanting. Fruit bristly, with more or less hairy beaks. Sandy or gravelly sea-coasts. Perennial (?). May—September.

A. 9, C. 20. Lat. 50°—55°. Alt. 0—100 yards. T. 52°—48°.

Note.—This plant is not confined to maritime localities, but is found in inland parts, as in Worcestershire. Nor is it seen only in the vicinity of saline springs, for it grows at Clent, opposite the church, at the foot of the hills, a dozen miles from any known salt spring.

E. littoreum, Willd. Leman in D. C., Fl. Fr., iv. 843. Rchb. Fl. Ger., v. 185. Root annual (?). Stems several, procumbent, or ascending, much branched, leafy, and hairy. Leaves somewhat cordate at the base, ovate with sharp ascending lobes or teeth, the lower on short stalks, the upper sessile, all rather rigid, with short, rough hairs growing out of minute papillæ. Peduncles rather longer than the leaves, bearing several flowers (three-four). Sepals elliptic, with a rather long awn, very hairy. Petals bright pink, scarcely so long as the sepals. Fruit rough, with white spreading hairs with a depression at the apex. Near the Chelsea old Water Works, Pimlico.

E. ciconium (?), Willd. Rchb. Fl. Ger., v. 184. Stems stout, spreading. Leaves large, with two-three pairs of ovate, pinnatifid or incised leaflets. Peduncles stout, rather longer than the leaves; pedicels short. Sepals *strongly-ribbed*. Carpels depressed at the summit. Wandsworth steam-boat pier. Annual. June—October.

ORDER CXII.—**BALSAMINACEÆ**, Rich. THE BALSAM FAMILY.

Succulent plants, with simple exstipulate leaves and axillary

flowers. Sepals five or three by abortion, deciduous, unsymmetrical, the lower one spurred. Petals five or fewer by coherence, irregular, deciduous. Stamens five, opposite to the sepals. Ovary with five combined carpels (five-celled), with sessile stigma. Fruit capsular, with five elastic valves, and septifragal dehiscence. Seeds many or solitary.

Impatiens, Linn. Balsam. Annual plants, with very succulent, leafy stems. Leaves undivided, serrated. Flowers axillary, stalked, pendulous, yellow or red, some are very ornamental. Calyx with two, small, unequal, deciduous sepals. Corolla with five unequal ringent petals.

1. **I. Noli-me-tangere**, Linn. E. B. 937, L. C. 242. Stem erect, branching, succulent, *slightly swollen at the joints*. Leaves soft, oblong or ovate, sharply serrated. Peduncles spreading, two-five-flowered. Flowers drooping, yellow, with small red spots within; spur wide at the base, tapering, straight and recurved at the point. Fruit glabrous, linear-elongate, angular. North Wales, Nannau, near Dolgelly. ("Phytologist," N. S., vol. i., p. 30.)

A. 3, C. 6. Lat. 52°—55°. Alt. ? T. 48°—46°.

2. **I. fulva**, Nutt. American Balsam. E. B. 2794, L. C. 241. Stems erect, succulent, *glabrous, tumid at the joints*, two-four feet high. Leaves ovate, smooth, flat, serrated *with reflexed glandular teeth*. Peduncles few-flowered. Flowers large, orange yellow, with red spots. On the Tillingbourne, from Albury Park Gardens downwards, and on the Wey, from below Shalford, near Guildford. Completely naturalized. Annual. July—September.

Alien. Naturalized only in Surrey (?).

Impatiens parviflora, Nutt. Small-flowered Balsam. Stem erect, round, smooth, shining, striated, slightly tumid, branching and leafy. Leaves ovate or oblong, tapering at the base, stalked, serrated; teeth with spreading or spreading-erect cartilaginous points. Peduncles axillary, elongate, many-flowered. Spur of the hooded sepal *elongated, small, tapering, straight*. Sepal opposite to the hooded one, with a thick herbaceous rib, both of them of a yellowish-white colour, the hooded one spotted with orange. Petals minute, yellow, with orange dots. Fruit angular. Naturalized about Nine Elms, Chelsea, Kew, and Mortlake. A plant from Battersea Fields taken into the garden has propagated itself now five seasons, and become a weed as plentiful as *Erigeron canadensis*. It is partially naturalized in the Isle of Wight, about Ryde.

Alien.

ORDER CXIII.—**OXALIDACEÆ**, D. C. THE WOOD-SORREL FAMILY.

Herbs, under-shrubs, or trees, with alternate, compound leaves. Calyx with five sepals, sometimes slightly cohering at the base, persistent. Petals five, unguiculate, with twisted prefloration. Stamens

ten, usually more or less united by their filaments. Ovary with five angles and five cells. Styles five, with capitate or somewhat bifid stigmas. Fruit capsular, membranous, valvular, with five cells, and five to ten valves. Seeds few, pendulous, in a fleshy envelope (aril?). Albumen fleshy, thick. Embryo straight or slightly curved. Radicle towards the hilum. The British species of this order are known by their trifoliate leaves and radical peduncles.

Oxalis. Wood-sorrel. Acid herbaceous plants, with scaly, bulbous, or fibrous roots, and compound mostly ternate leaves. Flowers axillary. Sepals five, more or less united at the base, acute, permanent. Petals five, connected by their claws, with spiral prefloration. Stamens ten, united at their base, the five outermost short. Anthers roundish, furrowed, incumbent. Ovary with five angles. Styles five, with obtuse, downy stigmas. Fruit capsular, five-celled, membranous, bursting at the angles. Seeds polished, enclosed in a fleshy, elastic tunic; sometimes one, sometimes several in each cell.

1. *O. Acetosella*, Linn. Wood-sorrel. E. B. 762, L. C. 243. Root *perennial*, branching, creeping, *knotty and scaly*. Stalk (radical peduncle) downy, *one-flowered*, with two small bracts near its middle, upright in flower, reflexed in fruit. Flowers *white*. Fruit (capsule) *ovate*. Seeds shining, striated. Woods. Perennial. May.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—1300 yards. T. 51°—34°.

2. *O. corniculata*, Linn. Yellow Wood-sorrel. E. B. 1726, L. C. 244. Root *annual*, fibrous. Stems several, spreading, and often rooting, or erect, reddish, hairy. Leaves ternate, petiolate, and stipulate; leaflets obcordate. Flowers *yellow, in pairs*, on long peduncles, branching at the top; pedicels refracted in fruit. Fruit *oblong*, many-seeded. Sometimes springing up in gardens as a weed, and also in shady, moist, waste places. Albury, Surrey. Annual. June, July.

3. *O. stricta*, Linn. Upright Yellow Wood-sorrel. L. C. 244*. Stems *erect*, branching. Leaves ternate, without stipules. Peduncles *several-flowered*, rarely one-two-flowered. Fruit (capsule) linear, oblong. Sometimes springing up spontaneously in gardens. Annual. June. By the riverside, Walton-on-Thames.—A. I.

ORDER CXIV.—**ELATINACEÆ**, Cambessedes, in "Mem. Mus." THE WATERWORT FAMILY.

Annual or perennial herbaceous plants, with opposite or verticilled leaves and axillary flowers. Sepals three-four, united at their base, persistent. Petals three-four, free, caducous. Stamens as many as the petals, or twice as many, free. Anthers two-lobed, introrse. Ovary free, with three-four carpels. Ovules inserted on the inner angle of the cells, reflexed. Styles three-four, short, with capitate stigmas. Fruit capsular, three-four-celled, many-seeded, crowned by the persistent styles, opening by the partition (septicidally). Seeds

cylindrical, more or less curved, without perisperm. Radicle towards the hilum.

Elatine, Linn. Waterwort. Marshy, more or less succulent, plants, with spathulate linear or lanceolate leaves, and very minute sessile or pedunculate flowers. Calyx in three-four divisions (sepals three-four, united at their base). Petals three-four. Stamens three-eight. Styles three-four. Capsule roundish, depressed, three-four-lobed, and with three-four many-seeded cells. Seeds cylindrical, more or less curved, striated-reticulate.

1. **E. hexandra**, D. C. *E. hydropiper*. E. B. 955, L. C. 143. *E. tripetala*. Eng. Fl. Small Waterwort. Stems scarcely an inch high, prostrate or ascending, round, smooth, striated, leafy, forming small matted tufts under water. Leaves spathulate, fleshy, longer than their stalks. Sepals three, lanceolate, distant. Capsule round, depressed at the summit, slightly tapering below, sessile (?), axillary. In this species the flowers and capsules are stalked. With the following, in a mill-pond, near Church Hill, Worcestershire. Annual. July—October.

A. 10, C. 15. Lat. 50°—58°. Alt. 0—100 yards. T. 52°—46°.

2. **E. hydropiper**, Linn. Biting Waterwort. E. B. 2670. L. C. 144. Stems prostrate, rooting, slender, leafy. Leaves broader than in the foregoing species, on longer stalks. Flowers sessile, with four petals. Capsules globular, smaller than in *E. hexandra*, axillary and sessile. This species does not grow in tufts. In a mill-pond, near Church Hill railway-station, with the former. Annual. July—October.

A. 3, C. 3. Lat. 51°—54°. Alt. 0—50 yards. T. 49°—48°.

ORDER CXV.—**LINACEÆ**, D. C. THE FLAX FAMILY.

Herbaceous plants or small shrubs, with entire exstipulate and usually alternate leaves. Sepals three to five, persistent. Petals as many as the sepals, unguiculate, twisted in prefloration (æstivation), fugacious. Stamens as many as the petals, united at the base by a ring. Ovary with as many cells as there are petals, seldom fewer. Styles as many as the cells. Stigmas capitate. Fruit capsular, multi-locular and valvular; the cells partially separated by spurious dissepiments, opening by two valves at the apex. Seeds compressed.

SYNOPSIS OF THE GENERA.

Linum. Sepals, petals, and stamens five, respectively.

Radiola. Sepals, petals, and stamens four.

I. **Linum**, Flax. Herbs or shrubs, with simple, entire, generally alternate leaves. Flowers lateral or terminal. Calyx with five lanceolate, erect, permanent sepals. Petals five, obtuse, twisted in prefloration, fugacious. Stamens five, inserted into an annular recep-

tacle with the petals, with five intermediate abortive filaments. Anthers arrow-shaped. Ovary ovate, with five cells and five styles, each bearing a blunt, undivided stigma. Fruit capsular, almost globular, five-celled, each cell being partially or completely divided by an entire or partial dissepiment. Seeds polished, compressed, acute, two in each cell when the capsule is five-celled, and one only when it is ten-celled.

SECT. I.—Leaves scattered.

1. **L. angustifolium**, Huds. Narrow-leaved Flax. E. B. 381, L. C. 201. Stems numerous, erect, round, leafy, branching above. Leaves scattered, linear-lanceolate, sharp-pointed. Sepals ovate, pointed, with scarious margins, ciliated and slightly keeled. Petals pale blue. Fruit slightly downy, with a tapering beak. Chalky and sandy places. Per-

Fig. 204.—*Linum usitatissimum*. 1, Flowering branch, with bud, flower, and fruit; 2, flower bud, as enveloped in the calyx (calyx removed), showing its twisted prefloration (æstivation); 4, horizontal section of a pistil.

ennial. July. Not unfrequent about Ryde, Isle of Wight.

A. 7, C. 15. Lat. 50°—55°. Alt. 0—100 yards. T. 52°—48°.

2. **L. perenne**, Linn. Perennial Blue Flax. E. B. 40, L. C. 200. Root woody, branched at the summit. Stems numerous, a foot high, or more or less, round, tapering, smooth, leafy. Leaves scattered, linear, pointed. Flowers in branching panicles. Sepals obovate, obtuse, pointed. Petals large, twisted in prefloration. Stamens variable in length. Stigmas bluntish, capitate. Chalky hills. Perennial. June.

A. 5, C. 8. Lat. 51°—55°. Alt. 0—100 yards. T. 50° (?)—47°.

3. **L. usitatissimum**, Linn. Common Flax. E. B. 1357, L. C. 199. Stems solitary, erect, branching, leafy. Leaves numerous, scattered, lanceolate, linear, pointed, smooth at the edges. Flowers blue, in a terminal, branching corymb, drooping when in bud, on long pedicels. Sepals ovate-acuminate, pointed with smooth membranous borders nearly as long as the capsule. Petals three times

as long as the calyx. Fruit *globular, with a short beak*. Seeds ovate, compressed. Roadsides, scarcely naturalized. Annual. July.

SECT. II.—Leaves opposite.

4. **L. catharticum**, Linn. Purging Flax. E. B. 382, L. C. 202. Stems very slender, erect, or ascending or spreading, *forked* or alternately branched. Leaves opposite, oblong, rough at the margin; lower leaves obovate. Flowers *small, white*, in irregular cymes, on long pedicels. Sepals elliptical, pointed, glandular, nearly as long as the capsule. Petals longer than the calyx. Seeds ovate, compressed. Grassy places, waysides, and dry banks. Annual. June—August.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—800 yards. T. 52°—37°.



II. **Radiola**, Gmel. Flax-seed. Small plants, with a repeatedly forked stem (dichotomous). Leaves entire, opposite. Flowers both axillary and terminal. Calyx with four sepals, each three-parted and connected at the base, persistent. Petals four, obovate. Stamens four. Ovary four-lobed, with four very short styles, and capitate stigmas. Capsule eight-ribbed, eight-valved, spuriously eight-celled, with solitary, compressed, polished seeds.



1. **R. millegrana**, Sm. Thyme-leaved Flax-seed. E. B. 893, L. C. 203. Stems erect, filiform, very slender, forked, reddish. Leaves

opposite, sessile, ovate, pointed. Flowers in terminal clusters or cymes, in the forks. Sepals two-three-parted. Corolla about as long as the calyx. Capsule globular. Moist, sandy heaths, often where the turf has been pared off. Annual. July.

A. 18, C. 60. Lat. 50°—60°. Alt. 0—100 yards. T. 52°—46°.

Fig. 204. — *Linum usitatissimum*. 3, Section of a flower; 5, vertical section of the ovary; 6, the capsule in the persistent calyx.

ORDER CXVI.—**CARYOPHYLLACEÆ**, Juss. THE PINK FAMILY.

Herbaceous plants, rarely half-shrubby at the base. Stems usually forked (dichotomous), jointed. Leaves opposite, quite entire, rarely with scarious stipules. Flowers in terminal forked cymes, either showy

and conspicuous or very small, or in clusters, or in panicles, or solitary. Sepals five, rarely four, free or united in a tube, usually persistent, imbricate in prefloration. Petals five, rarely four, under the ovary, or on a disk surrounding it, free, caducous or withering, imbricated or imbricated-twisted in prefloration, rarely absent. Stamens as many as the petals, or twice as many, free, the inner ones shorter than the outer. Ovary free, often on a stalk (a prolongation of the axis), with two-five carpels, rarely with two-five imperfect cells. Ovules on a central placenta, ascending, or at the inner angle of the cells. Styles two-five, filiform, the internal side bearing the stigmas. Fruit capsular, many-, rarely few-seeded, one-celled, rarely with two-five incomplete cells, opening by valves or by teeth, which are as many as the styles, or twice as many, very rarely baccate and indehiscent. Seeds more or less reniform, ovate or angular (lenticular), with a shagreened or tubercular epispem. Albumen farinaceous. Embryo usually annular or semiannular, surrounding the albumen. Radicle usually distant from the hilum.



Fig. 205. — *Dianthus Caryophyllus*. 1, A branch with a flower and flower-buds; 4, transverse section of the ovary.

SUB-ORDER I.—*Sileneæ*.

Sepals united in a tube (at least for some distance above the base), free at the apex. Petals with an elongated claw.

Genera.—*Dianthus*, *Saponaria*, *Silene*, *Lychnis*, *Cucubalus*.

SYNOPSIS OF THE GENERA.

Dianthus. Calyx *calyculate* (surrounded by bracts or scales at the base); styles two.

Saponaria. Calyx *without bracts* at the base; styles two.

Silene. Calyx *tubular*, more or less tumid, without bracts (*calyculate*); styles three.

Lychnis. Sepals and petals as in *Silene*; styles five.

Cucubalus. Styles three; fruit baccate.

I. *Dianthus*, Linn. Pink.

Herbaceous or somewhat shrubby plants. Leaves opposite, linear, keeled, mostly combined at the base. Flowers terminal, aggregate or solitary. Calyx tubular, five-toothed, surrounded at the base with two or six imbricated, opposite bracts. Petals five, with long narrow

claws, and a flat, dilated, variously notched limb. Stamens ten. Styles two. Capsule cylindrical, one-celled, opening with four valves (?). Seeds compressed, attached to a central placenta.

SECT. I.—Bracts at least half as long as the calyx. Flowers in heads or clusters.

1. **D. prolifer**, Linn. Proliferous Pink. E. B. 956, L. C. 145. Stems erect, ascending, or sometimes spreading, branching, glabrous. Leaves linear, narrow, with a prominent midrib, and rough edge. Flowers in dense round, terminal, sessile clusters (tufts) or heads. Bracts of the involucre several, unequal, scarious; the outer very short, the inner about as long as the calyx. Calyx quite enveloped by a scarious bract or scale. Petals rose-coloured. Sandy gravelly places; very rare. Annual. July.

A. 3, C. 4. Lat. 50°—53°. Alt. 0—50 yards. T. 51°—48°.

2. **D. Armeria**, Linn. Deptford Pink. E. B. 317, L. C. 146. Root tapering, oblique. Stem erect, straight, with swollen joints, more or less hairy at the junctions (articulations), leafy. Leaves linear-lanceolate, hairy or downy, ciliate. Flowers purple, in terminal and axillary tufts, each tuft containing several flowers, only one of

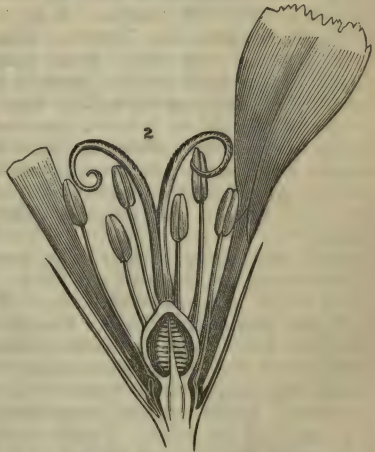


Fig. 205.—*Dianthus Caryophyllus*. 2, Section of flower, magnified.



Fig. 205.—*Dianthus Caryophyllus*. 3, Capsule open at the apex; 5, seed entire; 6, section of seed, showing the embryo.

which is usually open at once. Scales and bracts herbaceous, ribbed and downy, lanceolate, taper-pointed, about as long as the calyx. Seeds nearly flat, rough and pointed at one end. Dry sandy places, pastures, and about hedges. Near Netley Abbey, Hants. Annual. May—August.

A. 12, C. 25. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

SECT. II.—Bracts short, scale-like. Flowers in open cymes, or solitary.

3. **D. deltoides**, Linn. Maiden Pink. E. B. 61, L. C. 150.

Roots branching. Stems reclining at the base, rough, downy, glaucous. Leaves linear-lanceolate, rough. Scales (bracts) of the calyx ovate-acuminate, about one-third of the length of the calyx. Petals purple, *finely and regularly toothed*, with a deep purple ring at the top of the throat. Duppas Hill, Croydon; near Ham, Surrey; in a common field, opposite Teddington Lock. Perennial. July.

^ A. 12, C. 40. Lat. 50°—58°. Alt. 0—150 yards. T. 51°—46°.

Var. *β. glaucus*. L. C. 150 b. King's Park, Edinburgh. We saw some of the common form here, but none of the *rare beauty*.—W. P. and A. I. (See "Phytologist," N. S., vol. i., p. 417.)

4. *D. cæsius*, Sm. Mountain Pink. E. B. 62, L. C. 149. Roots bearing several leafy tufts. Stems erect, simple, or with an abortive branch at the base, slender, smooth, leafy, glaucous as well as the leaves. Leaves linear-lanceolate, blunt, with *rough, scarious edges*. Scales (bracts) obtuse, pointed, about *one quarter the length of the calyx*. Calyx faintly ribbed or furrowed with imbricating black segments. Petals obcuneate (inversely wedge-shaped), with a notched or dentate margin, and a long tapering claw; base of the limb (top of the claw) bearded with purplish bristly hairs. Perennial. June—August.

Still growing on Cheddar Cliffs, near Wells, Somersetshire. (See "Phytologist," N. S., vol. ii., p. 241.)

A. 1, C. 1. Lat. 51°—52°. Alt. ? T. 49°.

5. *D. plumarius*, Linn. Feathered Pink. Richb. Fl. Ger., vi. 257, L. C. 147. Stems procumbent, rooting, branching, forming dense tufts, where they grow spontaneously. Leaves short, channelled, linear, tapering, pointed, rough at the margin; whole herbage very glaucous. Scales roundish, scarcely pointed, scarcely one-fourth of the length of the calyx. Petals *deeply cleft, with linear segments*, hairy above the claw, and marked with purple. Fruit nearly cylindrical, contracted near the top, on an enlarged short carpophore. On an old wall, Shalford, Guildford, Surrey. Perennial. June (?).

A. 8.

6. *D. Caryophyllus*, Linn. Clove Pink. E. B. 214, L. C. 148. Root rather woody. Stems erect or ascending, *glabrous, glaucous*. Leaves linear, glabrous, glaucous; leaves of the barren shoots linear-elongate. Scales of the calyx roundish, ridged at the top (obovate), mucronate, scarcely one-fourth of the length of the tube. Teeth of the calyx *entire at the margin*. Petals red or rose-coloured, *unequally and sharply toothed*. This is said to be the parent of our fine garden Carnations. On Rochester Castle, and probably on other castles in Kent; Boxley Abbey, near Maidstone. Perennial. July, August.

A. 8.

II. *Saponaria*, Linn. Soapwort. Smooth or hairy, often viscid, herbaceous plants. Leaves opposite. Flowers in forked panicles or terminal cymes. Calyx tubular, five-toothed. Petals five, with narrow claws and a dilated limb. Stamens ten. Styles two-three-five. Capsule opening by four valves. Seeds reniform, globular.

S. officinalis, Linn. Common Soapwort. E. B. 1060, L. C. 151. Root *perennial, creeping widely*. Stems erect, stout, simple or branching, leafy, downy or smooth. Leaves on short petioles. Ovate- or oblong-lanceolate, strongly ribbed beneath. Flowers rosy white, in tufts, arranged in a close panicle. Calyx herbaceous, downy, protuberant at the base. Fruit stipitate, opening at the top by four reflexed teeth. Borders of fields, chalk-pits. Perennial. July, August.

A. 15, C. 50. Lat. 50°—56°. Alt. 0—150 yards. T. 52°—47°.

Var. *β*. *Saponaria concava anglica*. Bauh. Pin. 206. *Lychnis Saponaria dicta*, Raii. Syn. 339. *Gentiana concava*, Ger. Em. 435. Gerard's account of this variety is as follows, *loco cit.*:—"I found this strange kind of Gentian in a small grove of a wood, called the Spinie, neere unto a small village in Northamptonshire, called Lichbarrow; elsewhere I have not heard of it." Johnson's remark is, "Not having as yet seen the plant, I can affirm nothing of certaintie." Sir J. E. Smith notices it thus:—"Var. *β*. has some of the upper leaves combined and sheathing, with a monopetalous corolla."

Is this *S. hybrida* of Linn.?

S. vaccaria, Linn. *Gypsophila vaccaria*, Sm. Fl. Græc. 380. Root *annual*. Stem erect, *repeatedly forked*, glabrous. Leaves sessile, ovate-lanceolate, slightly connate at the base. Flowers pink or rosy, in a lax cyme. Calyx with five-winged angles, membranous. Petals not much surpassing the calyx. Capsule opening by four *erect* valves (teeth). Riverside, near the steam-boat pier, Wandsworth. It was observed here during three or four seasons, but it is now extinct. The habit and appearance of this species, as Smith says, agree better with *Gypsophila* than with *Saponaria*.

A. 1.

III. **Silene**, Linn. Catch-fly. Annual or perennial herbaceous plants, with leafy, jointed stems, and opposite, entire leaves, united at the base. Flowers in terminal or lateral cymes. Calyx tubular, angular, or furrowed, sometimes inflated, with five teeth, *without scales at the base*. Petals five, with narrow claws, and generally an upright scale at the base of the limb, forming a crown at the throat of the corolla. Filaments ten. Styles three. Capsule imperfectly three-celled, six-valved. Seeds numerous, kidney-shaped.

1. **S. anglica**, Linn. English Catch-fly. E. B. 1178, L. C. 155. Root slender, tapering, fibrous. Herbage densely hairy, more or less luxuriant and glutinous. Stem erect or recumbent, branched, leafy. Leaves oblong-lanceolate or obovate, tapering towards the base. Flowers solitary, from the axils of the upper leaves on short pedicels. Calyx of the flower cylindrical, of the fruit *ovate, with five viscid green ribs*, contracted at the apex, not *umbilicate* at the base. Petals small, white or with a reddish tinge, slightly cleft, with a cleft scale above the claw. Capsule invested with the calyx, *nearly sessile*. Gravelly and sandy corn-fields. Annual. June—August.

A. 14, C. 40. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—47°.

Var. *a. quinque vulnera*. Petals white or roseate, with a deep purple spot in the centre of each limb. Steam-boat pier, Wandsworth.

In the same place there grew another variety, with the following characters:—Leaves linear-oblong, hairy, and glandular; calyx with long, white, spreading, cartilaginous hairs; petals spreading, notched, reflexed, pink; crown erect, with five erect cleft *laminae*.

2. *S. nutans*, Linn. Drooping Catch-fly. E. B. 465, L. C. 156. Root somewhat woody, branching. Stems erect or ascending, three-forked, downy or hairy, and viscid above. Lower leaves *lanceolate*, tapering into a petiole. Stem-leaves lanceolate or linear. Flowers white, usually drooping, in a lax panicle. Calyx hairy or downy, with triangular short teeth; *swollen above when in fruit*. Petals deeply cleft, with a crown. Fruit on a long stipe. Seeds finely shagreened. On limestone and chalk cliffs. On Nottingham Castle Rock. Rocks in Dovedale. Perennial. May—July.

A. 7, C. 12. Lat. 50°—57°. Alt. 0—100 yards. T. 51°—48°.

3. *S. italica*, Pers. *S. patens*, Peete. Italian Catch-fly. E. B. 748 L. C. 156* (Excluded Species, 3rd ed.) Root woody. Stems erect or ascending, six-eighteen inches high, more or less hairy. Lower leaves *spathulate*, tapering into the petiole; the upper leaves linear-lanceolate. Flowers erect on short peduncles (pedicels?), in lax pyramidal clusters. Calyx inflated, slightly umbilicate, downy, and often glandular, with ovate, blunt teeth. Petals cleft or obcordate, without a crown. Capsule *ovate-oblong, acuminate, with a long stipe* (a column elevating the capsule, thecaphore). Seeds tubercled, and flat on both sides. Perennial. May—August.

In the "Fl. Vect.," p. 62, there is an elaborate description of the *Silene*, which grows on the top of the cliff, and on the land-slips below it, in Sandown Bay. The Isle of Wight plant very much resembles the Fig. in E. B. above quoted, *S. patens*, Peete. Dr. Bromfield describes it as *S. nutans*.

4. *S. Otites*, Sm. Spanish Catch-fly. E. B. 85, L. C. 154. Root woody, tapering. Stems erect, downy or viscid, simple. Lower leaves *spathulate*; stem-leaves almost linear. Flowers *diœcious*, rarely polygamous, small, numerous, clustered, disposed in a rather close panicle. Calyx tubular-campanulate, glabrous; teeth triangular, short, often split when in fruit. Petals linear, entire, *without scales above the claw*. Capsule ovate, longer than the calyx, sessile. Eastern Counties of England. Perennial. June—August.

A. 2, C. 3. Lat. 52°—53°. Alt. 0—50 yards. T. 49°—48°.

5. *S. inflata*, Sm. Bladder Catch-fly. E. B. 164, L. C. 153. Root vertical. Stems ascending, often prostrate at the base, branching, glabrous, or slightly downy below. Leaves glabrous, slightly ciliated or toothed, oblong or ovate-lanceolate. Flowers white, in a terminal cyme. Calyx *glabrous, ovate, bladder-like, veined*, with large triangular teeth, not torn by the mature fruit. Petals cleft, with two small tubercles above the claw. Fruit roundish, on a thick stalk,

nearly half as long as the capsule. Roadsides, dry pastures; common. Perennial. June. Not common in the North of Scotland.

A. 17, C. 75. Lat. 50° — 58° . Alt. 0—250 yards. T. 52° — 44° .

Var. *β. minor*. Leaves all linear; flowers small. At Wandsworth steam-boat pier.

Var. *hirsuta*. Plant hoary, tubercled. Common in the South of England.

6. *S. maritima*, With. Sea Bladder-Campion. E. B. 597, L. C. 153*. Stems decumbent, flexuous, swollen at the articulations, quite smooth; flowering stems erect. Leaves *lanceolate*, tapering, quite entire, pointed. Flowers few, white. Calyx inflated, membranous, with reticulating veins and short triangular teeth. Petals cleft, crowned to the base of the limb, *with two projecting teeth on the top of the long narrow claw*. Fruit roundish, with a tapering, very blunt beak, on an enlarged, rigid, roundish carpophore. Rocks and shingly places by the sea. Perennial. June. *Gravelly shores by the Bay.* J.S.

A. 18, C. 60. Lat. 50° — 61° . Alt. 0—1000 yards. T. 52° — 36° .

7 *S. conica*, Linn. Striated Corn Catch-fly. E. B. 922, L. C. 158. Root tapering, small. Stems erect, six-twentyfour inches high, round, tapering, finely downy, leafy. Leaves linear-lanceolate, acute, downy. Flowers from the forks or at the summits. Calyx cylindrical or conical, *umbilicate at the base, with thirty green ribs*; teeth long and tapering. Petals small, each with a red, cleft limb and a cleft or divided scale at its base. Capsule ovate, rather shorter than the calyx. East of England and Scotland (?). May—July.

A. 4, C. 5. Lat. 51° — 57° . Alt. 0—100 yards. T. 51° — 48° .

8. *S. noctiflora*, Linn. Night-flowering Catch-fly. E. B. 291, L. C. 157. Stem erect, round, furrowed, repeatedly forked, hairy and viscid above. Leaves oblong-lanceolate, tapering at the base; upper ones lanceolate, sessile and rounded at the base. Flowers solitary in the forks, or terminal (cymose). Calyx oblong, club-shaped, or ovate, *very viscid, with ten ridges, and long, setaceous, subulate teeth*. Petals deeply cleft, with a cloven scale or crown at the base of their limb (top of the claw). Capsule ovate-conical, shortly stipulate. East of England, in corn-fields. Annual. July. Wandsworth steam-boat pier.

A. 9, C. 25. Lat. 50° — 57° . Alt. 0—200 yards. T. 50° — 47° .

Silene catholica, Ait. Hort. Kew, ill. 85. *Cucubalus catholicus*, Linn, an Italian species, has been reported in the "Phytologist," N. S., vol. ii., p. 220, for September, 1857, from Suffolk, "among trees separating the Park from the parsonage of Great Livermere, near Bury St. Edmund's."

S. Armeria, Linn. Deptford Catch-Fly. E. B. 1398, L. C. p. 15. Stems slender, erect, branching, leafy. Leaves clasping at the base, linear-lanceolate, blunt. Flowers terminal and lateral, in many-forked cymes. Calyx smooth, with more or less prominent ridges. Petals notched, spatulate, with two scales; claws longer than the calyx. Capsule club-shaped. Wandsworth steam-boat pier. Annual. July.

Alien.

S. alpestris, Jacq. Alpine Catch-fly. Root fibrous. Stems branching, downy or hairy. Leaves lanceolate, blunt. Calyx cylindrical, top-shaped, with ovate, blunt teeth. Petals pure white, with a four-toothed scalloped limb. Claws crowned with two flat, ovate, petal-like processes. Said to have been collected by the late Mr. George Don, on a mountain to the east of Clova, Forfarshire. Perennial. June.

9. *S. acaulis*, Linn. Moss-Campion. E. B. 1081, L. C. 159. Roots long, branching, crowned by short, branched, tufted, leafy stems. Leaves linear, crowded, smooth, slightly fringed at the base. Flowers solitary, terminal. Calyx smooth, more or less inflated, with short blunt teeth and a reddish tinge. Petals slightly notched or entire, with a minute cloven scale at the base of the limb. Capsule ovate-cylindrical, twice as long as the calyx. On the Scottish mountains. Perennial. June—August.

A. 6, C. 15. Lat. 53°—61°. Alt. 0—1450 yards. T. 44°—32°.

IV. *Lychnis*, Linn. Lychnis, Campion. Stems hairy, slightly glandulous above. Leaves ovate, oblong or lanceolate. Flowers imperfect (dioecious), in forked or irregular cymes. Calyx tubular, more or less inflated, five-toothed, without a secondary calyx (calycule). Petals five, with long claws, with a crown of scales above the claws. Stamens ten. Styles five. Capsule one-celled, opening at the top by five-ten valves.

1. *L. diurna*, Sibth. Red Campion. E. B. 1574, L. C. 163. Stem erect, hairy, branching above, slightly glandular at the apex. Leaves downy, the root-leaves and lower stem-leaves attenuated into petioles, the upper ovate-oblong, tapering. Flowers usually red or rosy, in a cyme, more or less numerous. Calyx *reddish, inflated in the male flowers and ovate in the female flowers*. Petals cleft. Fruit ovate-sessile, with *reflexed teeth* when the fruit (seed) is ripe. Hedges and woods. Perennial. May.

A. 18, C. 81. Lat. 50°—61°. Alt. 0—900 yards. T. 52°—38°.

Var. Stem-leaves quite smooth. Much taller, slenderer and handsomer than the common form of *M. sylvestre*. Calyx like the calyx of *L. Flos-cuculi*, and quite smooth. Petals narrow, not ragged, but bifid. Another variety with narrow, toothed, or notched petals, neither cleft nor ragged. Banks round fields, Colchester.

2. *L. vespertina*, Sibth. White Campion, E. B. 1580, L. C. 164. Stems erect, branching above, round, hairy, somewhat glandular at the summit. Lower leaves narrowed into a petiole, the upper lanceolate, all hairy. Flowers *white*, in a lax, few-flowered cyme. Calyx green, scarcely swollen in the male flowers, becoming ovate in the female ones. Petals more or less deeply cleft. Claw crowned, with erect, spreading teeth. Fruit ovate, sessile, with *erect teeth*. Fields, fallows, waysides. Perennial. June.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—350 yards. T. 52°—43°.

3. *L. Flos-cuculi*, Linn. Ragged Robin. Cuckoo-flower. E. B. 573, L. C. 162. Root creeping. Stems erect or reclining at the base, branching above and emitting scions from below, rough,

angular. Leaves hairy at the base, smooth above, the lower oblong, attenuated into a petiole, the upper *oblong-lanceolate* or *linear*. Flowers purple, in a terminal cyme or lax panicle. Calyx coloured, not hairy, but rough, with puckered angles and triangular-pointed teeth. Petals *deeply-parted into four unequal linear segments*, with scales at the base of the limb. Fruit capsular, ovate, sessile, one-celled. Wet meadows. Perennial. June.

A. 18, C. 82. Lat. 50° — 51° . Alt. 0—650 yards. T. 51° — 40° .

4. **L. viscaria**, Linn. Red German Catch-fly. E. B. 788, L. C. 161. Root somewhat woody. Stems erect, simple, glabrous, *viscid below the articulations*. Leaves glabrous, linear-lanceolate, with the margins woolly at the base. Flowers purple, in tufts, on a short common peduncle, and very short pedicels. Calyx usually coloured, glabrous, with short, triangular-pointed teeth. Petals *entire or slightly notched, with a crown surmounting the long claws*. Fruit ovate, on a longish pedicel (carpophore). Seeds minute, reniform, sharply tubercled. In dry, rocky, mountainous places. Perennial. June.

A. 3, C. 6. Lat. 52° — 57° . Alt. 0—300 yards. T. 47° — 46° .

5. **L. alpina**, Linn. Red Alpine Campion. E. B. 2254, L. C. 160. Stem erect, round, smooth, leafy, a few inches high (three-six), quite simple. Root-leaves in a dense rosette. Stem-leaves clasping, all linear or linear-lanceolate. Flowers in a dense round head, rose-coloured. Petals cleft, crown only two small tubercles on each petal. Capsule stipitate, on a carpophore one-third of the length of the capsule, five-celled when young, with membranous partitions. Seeds reniform, minute, *tubercled*. Clova mountains, Scotland, and Cambrian mountains, England. Perennial. June, July.

A. 2, C. 2. Lat. 56° — 57° . Alt. 700—1000 yards. T. 40° — 37° .

6. **L. Githago**, Lam. *Agrostemma Githago*, Linn. Corn Cockle. E. B. 741, L. C. 165. Stems erect, slender, simple or forked, hairy. Leaves linear, hairy, ciliated, long. Flowers solitary, showy, on long, terminal foot-stalks. Calyx ovate-cylindrical, with prominent, rounded, hairy ribs, separating into *five linear-lanceolate, elongated segments, nearly twice as long as the petals*. Petals obovate, *nearly entire or slightly notched*, without a crown, marked by three dark lines. Corn-fields. Annual. June, July. *especially among wheat*

A. 18, C. 81. Lat. 50° — 60° . Alt. 0—200 yards (?). T. 52° — 46° . *on pu*

V. **Cucubalus**, Gaert. Cucubalus. Prostrate or climbing plants, with petiolate ovate leaves; herbage hairy or downy. Flowers solitary or in pairs, laxly paniced. Calyx bell-shaped, ribbed, five-cleft. Petals five, long-clawed, crowned above the claw. Stamens ten, styles three. Fruit, a berry, not opening.

C. bacciferus, Linn. Berry-bearing Cucubalus. E. B. 1577, L. C. Excluded Species. Stem weak, trailing, round, tapering, with swollen joints, viscid and clothed with soft, shaggy hairs, leafy, branches opposite, divaricate. Leaves ovate, tapering at both ends, on short stalks. Flowers in cymes, sepals lanceolate, scarious at the

edges; petals twice as long as the sepals, deeply cleft, with ribbed claws, pure white or greenish white. Claw of the petals crowned with two tubular-toothed processes. Berries black, shining. Hedges, shady moist places. Isle of Dogs, London. Perennial. July.

Alien.

SUB-ORDER II.—*Alsineæ*. THE CHICKWEED TRIBE. Sepals four-five. Petals as many as the sepals, not unguiculate, but sessile, deciduous, generally two-lobed or cleft, sometimes absent. Stamens usually twice as many as the sepals, rarely of the same number or fewer. Styles two-five. Capsule one-celled, with as many valves or teeth as there are stigmas in the flower. Seeds indefinite, rarely few or solitary.

Genera.—*Lepigonum*, *Spergula*, *Sagina*, *Alsine*, *Holosteum*, *Arenaria*, *Stellaria*, *Cerastium*, &c.

SYNOPSIS OF THE GENERA.

Lepigonum. Leaves stipulate. Styles three. Capsule opening to the base by three valves.

Spergula. Leaves stipulate. Styles five. Capsule opening by five valves.

Sagina. Leaves exstipulate. Styles four. Capsule four-valved.

Buffonia. Petals and stamens four, respectively. Styles two.

Alsine. Styles three. Capsule three-valved.

Holosteum. Petals toothed and fringed. Capsule opening by six teeth.

Arenaria. Styles two-three. Capsule opening by four-six teeth.

Honckenya. Succulent plants, with three styles and three-valved capsules.

Stellaria. Petals cleft or parted, nearly to the claw. Styles three. Capsule six-valved.

Moenchia. Sepals, petals, and stamens four respectively. Capsule eight-ten, toothed.

Cerastium. Petals cleft or parted. Styles five, rarely four. Capsule opening by twice as many teeth as there are styles in the flower.

Malachium. Capsule opening by five two-toothed valves. A genuine *Cerastium* (?).

VI. *Lepigonum*, Wahl. Fl. Goth. 45. *Arenaria*, Sm. *Spergularia*, Pers. L. C. 175. Annual plants, with stipulate leaves. Flowers in cymes, usually reduced to unilateral clusters. Sepals five. Petals five, entire. Stamens ten, or fewer by abortion. Styles three. Capsule opening to the base by three valves.

1. ***L. rubrum*, Wahl. *Arenaria rubra*, Linn. and Sm. Purple Sandwort. E. B. 852. *S. rubra*. L. C. 175.** Stems numerous, spreading, erect at the summit, leafy, nearly glabrous below, hairy, glandular above. Leaves thick, linear, subulate, pointed. Stipules entire, scarious. Flowers on short pedicels, which are about as long as the calyx, rose-purple, in one-seeded leafy clusters. Sepals hairy, glandular, scarious only at the edges. Seeds not winged. Sandy or gravelly places. Annual. May. June.

A. 17. C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 52°—46°.

x

Berwyn Mountains near the top of Llancynno

2. **L. rupestre**, Wahl. (?) *Spergularia rupestris*, Cambes. Mem. du Mus. St. Hilaire, Fl. Bras. 110. L. C. 174*. (See Appendix.)

3. **L. marinum**. *Arenaria marina*, Sm. E. B. 958, L. C. 174. Stems bluntly angular, compressed, swollen at the articulations, erect or reclining, smooth or downy. Leaves cylindrical, fleshy, blunt, with scarious stipules. Flowers in terminal cymes. Sepals blunt, fleshy, with a very narrow scarious border. Flowers pink. Fruit ovate, triangular at the apex. Seeds roundish, compressed, with a broad, conspicuous, white, scarious, marginal rim. Muddy places by the sea and near tidal rivers. Annual (?). July.

A. 18, C. 50. Lat. 50°—61°. Alt. ? T. 52°—46°.

4. **L. medium**, Fr. Root woody. Stems numerous, thickly covered with glandular hairs. Leaves rather fleshy, tipped with a minute, horny point. Capsule slightly longer than the calyx. Seeds with a thickened, rough border. Cliff at Tenby; slate at Ilfracombe; limestone, Plymouth and Torquay. Mr. F. J. A. Hort, in "Phytologist," November, 1848.

VII. **Spergula**, Linn. Spurrey. Annual plants, with linear, subulate leaves, in opposite fascicles, apparently whorled. Stipules scarious. Flowers white, in cymes, usually reduced to unilateral clusters. Sepals five. Petals five, entire. Stamens five-ten. Capsule valvular, opening by five valves to the base.

1. **S. arvensis**, Linn. Corn Spurrey. E. B. 1535, L. C. 172. Stems spreading, round, hairy, sometimes glabrous or glandulous, enlarged at the articulations. Leaves linear, setaceous, convex, with a longitudinal furrow on the under surface, hairy. Stipules scarious, small, very abruptly pointed. Pedicels spreading or refracted after flowering. Sepals herbaceous, with a narrow, scarious margin. Petals about as long as the calyx. Fruit smooth. Seeds round, tubercled, with a border, blackish brown; tubercles or papillæ pale. Corn-fields. Annual. June.

2. **S. pentandra**, Linn. E. B. 1536, L. C. p. 16. Stems solitary or several, erect or ascending, glabrous or nearly so. Leaves not grooved on the under side. Stamens five. Seeds compressed, with a large scarious margin. Ireland. Annual. April—June.

Species *dubia* (a doubtful plant).

VIII. **Sagina**, Linn. Pearlwort. Small annual or perennial plants, with opposite, linear, filiform, or subulate leaves, and minute, axillary or terminal, solitary, stalked flowers. Sepals four-five, concave and bluntish. Petals entire, four, rarely five, sometimes wanting. Stamens four-five-ten. Stigmas four-five, sessile. Capsule one-celled and four-eight-valved, opening to the base. Seeds numerous, on a central placenta.

SECT. I.—Sepals five. Styles five. Capsule five-valved.

1. **S. nodosa**, Meyer. *Spergula nodosa*, Linn. Knotted Spurrey. E. B. 694, L. C. 171. Stems several, slender, almost filiform, reclining or prostrate at the base, ascending, usually branched, slightly hairy

or nearly glabrous. Leaves subulate, blunt; upper leaves short, in axillary tufts. Pedicels erect, *five times as long as the calyx*. Sepals close to the capsule, thick, fleshy, blunt. Petals five, about as long as the sepals. Seeds numerous, black, finely muricated or shagreened. Sandy moist places. Perennial. July.

A. 18, C. 75. Lat. 50°—60°. Alt. 0—500 yards. T. 52°—42°.

2. ***S. subulata***, Wimm. *Spergula subulata*, Swartz. E. B. 1082, L. C. 170*. Stems numerous, slender, almost filiform, prostrate at the base, ascending, usually branching, invested with short, more or less glandular hairs. Leaves subulate, pointed (awned), ciliated, with short glandular hairs, with a tuft of axillary leaves as in the foregoing species. Pedicels usually contiguous at the top of the stems, *ten-fifteen times longer than the calyx*, reflexed after flowering, and erect when in fruit. Sepals linear, with scarious tips and margins. Petals rather longer than the calyx. Styles five. Capsule five-valved. Gravelly places. Is this obscure species a variety of *S. procumbens*? Perennial. June—August.

A. 15, C. 40. Lat. 50°—61°. Alt. 0—800 yards. T. 51°—40°.

3. ***S. saxatilis***, Wimm. *Spergula saginoides*, Sm. Smooth Awl-shaped Spurrey. E. B. 2105, L. C. 170. Stems in tufts, prostrate below, ascending above, quite smooth, leafy. Leaves linear-setaceous, pointed, smooth, *fleshy*. Peduncles solitary, terminal, reflexed after flowering, finally erect. Sepals blunt, ovate, fleshy, with a narrow membranous edge, longer than the petals, shorter than the capsule. Petals obovate. Valves of capsule oblong, *recurved at the tips*. Seeds roundish, kidney-shaped, smooth, brown, not bordered. On lofty mountains in Scotland. An alpine form of *S. procumbens* (?). Perennial. June.

A. 3, C. 6—8. Lat. 56°—59°. Alt. 650—850 yards. T. 40°—38°.

SECT. II.—Sepals four. Styles four. Capsule four-valved. (Flowers tetramerous.)

4. ***S. procumbens***, Linn. Procumbent Pearlwort. E. B. 880, L. C. 167. Stems numerous, slender, thread-shaped, spreading, prostrate or ascending, rooting below, usually branched, glabrous. Leaves linear, pointed, *not ciliated*. Pedicels capillary, curved (reflexed) at the apex after flowering, erect when the fruit is ripe. Sepals four, spreading after flowering. Petals not *half so long as the sepals*, often wanting. Fruit a capsule, opening by four valves. On walls, heaths, and dry places. Annual (?). May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1250 yards. T. 52°—35°.

5. ***S. maritima***, Don. Sea Pearlwort. E. B. 2195, L. C. 168. Stems numerous, spreading, with ascending, elongate, leafy branches. Leaves short, broad; margin scarious, at the base, blunt. Flower-stalks long, slender, *erect*. *Sepals broadly ovate, obtuse*. Capsule longer than the calyx. Scottish coast and eastern shores of England. Annual. May—August.

A. 14, C. 40. Lat. 50°—61°. Alt. ? T. 52°—46°.

S. densa, Jord. (See "Phytologist," N. S., vol. ii., p. 23.) Stems much branched, and forming dense tufts. Capsule rounded, stalked.

6. **S. apetala**, Linn. Erect Pearlwort. E. B. 881, L. C. 169. Stems numerous, very slender, filiform, ascending or erect, branching, glabrous or slightly downy. Leaves *linear, fleshy*, but not cylindrical, some slightly ciliated and auricled, with a scarious edge and a short mucro (point), many without the usual tuft of leaves in their axils. Pedicels very long, erect or slightly reflexed after flowering. Sepals ovate, hooded, keeled, not so long as the capsule, and closely enveloping it. Petals much shorter than the calyx, often abortive. Capsule longer than the calyx. Seeds numerous, brown. About walls; generally in dry places. Annual. May—September.

A. 15, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

7. **S. ciliata**, Fr. Fringed Pearlwort. L. C. 169*. Stems slenderer than in the above, hairy. Leaves shorter, more fleshy, cylindrical, ciliated through their whole extent, *with fascicles of leaves in their axils*. Capsule not much longer than the calyx. Flowers on shorter pedicels more numerous and contiguous. Chelsea Hospital. Annual. May—September.

IX. **Buffonia**, Linn. Calyx four-parted. Petals four, entire or two-toothed. Stamens four, opposite to the sepals, or eight, and then opposite and alternate, inserted on a disk which surrounds the ovary (perigynous disk). Styles two, opposite to the two valves. Seeds two, erect, basilar.

B. tenuifolia, Linn. E. B. 1313, L. C. Excluded Species, p. 16. Roots slender, fibrous. Stem alternately branched, spreading. Leaves awl-shaped (subulate). Flowers on rough pedicels, in a thyse (a panicle tapering at both ends). Sepals lanceolate, acuminate (an extended point), with three confluent nerves. Petals much shorter than the calyx. Filaments and styles very short. Seeds minute, scarcely tubercular. Found near Boston, by Plukenet, and on Hounslow Heath, by Mr. Doody. Compare Ray's Synopsis by Dillenius. Not found since. Annual. June.

X. **Alsine**, Wahl. Annual or perennial plants, with linear, subulate, or setaceous leaves, without stipules. Flowers white, in forked terminal cymes. Sepals five, petals five, entire. Stamens ten or fewer. Styles three. Capsule opening to the base by three valves.

1. **A. tenuifolia**, Wahl. *Arenaria tenuifolia*, Sm. Fine-leaved Sandwort. E. B. 210, L. C. 179. Stems procumbent, forked from the base, mostly smooth. Leaves *subulate*, three-nerved, with a point. Flower-stalks erect, longer than the leaves. Flowers small, numerous, axillary. Sepals *lanceolate-subulate*, herbaceous, three-nerved, with a narrow scarious border, *much longer than the petals*. Petals oblanceolate. Capsule pellucid, with three valves. Sandy, chalky places. Annual. June.

A. 6, C. 15. Lat. 50°—53°. Alt. 0—100 yards. T. 51°—48°.

Var. **B. viscidula**. Very slender, with glandular short hairs, and smaller flowers than the type.

2. **A. stricta**, Wahl. *A. uliginosa*, Schl. Marsh Sandwort. E. B. 2890, L. C. 181*. Stem prostrate, tufted. Leaves filiform, *nerveless*. Flower-stalks erect, *very long*. Sepals ovate-acute, three-nerved. Petals as long as the sepals, oboval, tapering below. Capsule ovate, rounded. Teesdale; very rare. Perennial. June.

A. 1, C. 1. Lat. 54°. Alt. ? T. ?.

3. **A. verna**, Jacq. Vernal Sandwort. E. B. 512, L. C. 180. Flowering-stems erect, filiform, forked, with only a few leaves; barren stems prostrate, tufted, leafy. Leaves linear, subulate, sharp, quite smooth. Peduncles long, single-flowered, hairy; hairs spreading. Sepals ovate-lanceolate, with a membranous margin, hairy, acute. Petals rounded, somewhat cordate, *larger than the sepals*. Fruit cylindrical, three-valved, longer than the calyx. In mountainous parts; not uncommon. Perennial. May—September.

A. 12, C. 25. Lat. 50°—58°. Alt. 0—850 yards. T. 52°—38°.

4. **A. rubella**, Wahl. Alpine Sandwort. E. B. 2638, L. C. 181. Wahl. Fl. Lap. 128, t. 6. Stems numerous, leafy, forming dense tufts. Flowering-stalks downy, one-flowered, with one-three pairs of leaves. Leaves linear-lanceolate, mucronate, with three prominent dorsal nerves. Flowers *solitary, reddish*. Sepals prominently three-nerved, acute, with a membranous margin. Petals obovate, narrowed below, shorter than the sepals. On the tops of the Scottish mountains. Ben Lawers. Perennial. June.

A. 2, C. 2. Lat. 56°—59°. Alt. 850—1300 yards. T. 38°—34°.

A. fastigiata, Hall. E. B. 1744, L. C. p. 16. Stems four-five inches, branched, leafy, round, nearly smooth. Leaves slender, smooth, three-ribbed at the base. Flowers in level-topped cymes. Sepals tapering, whitish. Petals shorter than the calyx. Mountains of Scotland. Annual. June.

One of the species *dubiae*, introduced by Mr. G. Don, and circulated by the rather credulous (?) authors of E. B.

5. **A. Cherleri**, Fenzl. *Cherleria sedoides*, Linn. Dwarf Cyphel. E. B. 1212, L. C. 198. Roots rather woody, bearing dense tufts of leafy stems, which are either prostrate or partly erect, all branching. Leaves linear-lanceolate, somewhat downy, with *prominent dorsal nerves*, and *finely ciliated margins*. Flowers solitary, erect, terminal. Sepals keeled, and slightly ribbed, lanceolate. Petals *usually wanting*. On the tops of the loftiest mountains of Scotland. Perennial. July.

A. 4, C. 8. Lat. 56°—61°. Alt. 850—1300 yards. T. 38°—34°.

XI. **Honckenya** (*Honkeneja*, Ehrh.) Smooth, succulent, procumbent, perennial plants, with much-branched, angular, leafy stems. Flowers perfect and dioecious. Sepals five, one-nerved. Petals five, entire, more developed in the male flowers, with a *disk and nectariferous glands*. Stamens ten, without pollen in the female flowers. Ovary barren in the male flowers. Styles three. Capsule fleshy, globular or roundish, with as many valves as styles. Seeds few, large, pyriform, beaked, dotted, furrowed on one side.

H. peploides, Ehrh. Sea Chickweed. E. B. 189, L. C. 173. Stem spreading, many times forked. Leaves ovate, acute, glabrous, one-nerved. Pedicels axillary, about as long as the calyx. Sepals ovate, obtuse, one-nerved, shorter than the petals. Capsule rugose, large, globular, one-third part longer than the calyx. The root creeps very extensively, and the stems are often more than half-buried in the sand.—Sm. Sandy sea-coasts. Perennial. June—September.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—46°.

XII. Holosteum, Linn. Jagged Chickweed. Smooth, rather glaucous, annual plants. Leaves entire. Flowers umbellate or paniced. Sepals five, ovate, concave. Petals five, unequally jagged or toothed. Stamens five, three, or four, rarely ten. Styles three, short, with bluntish, downy stigmas. Capsule nearly cylindrical, opening with six teeth. Seeds numerous, rough.

H. umbellatum, Linn. Umbellate Jagged Chickweed. E. B. 27, L. C. 183. Stems erect or spreading, simple, glaucous, often reddish, downy, viscid, with two-three pairs of leaves. Pedicels unequal, refracted after flowering. Sepals scarious at their margins. Petals white, rarely rose-coloured, longer than the sepals. On walls, at Norwich, Yarmouth, &c. Annual. April.

A. 1, C. 2. Lat. 52°—53°. Alt. 0—50 yards. T. 49°—48°.

XIII. Arenaria, Linn. Sandwort. Small herbaceous or half shrubby plants, with numerous or much-branched, slender stems. Leaves entire. Flowers small. Calyx four-five-pointed, spreading, mostly ribbed sepals. Petals four-five, ovate or lanceolate, not divided, withering. Stamens ten or fewer, on a glandular disk. Styles two-three, spreading, with downy stigmas. Capsule one-celled, opening by four-six teeth, or by three, four, or six valves. Seeds numerous, kidney-shaped, roughish.

SECT. I.—Seeds smooth, arillate (*Moehringia*).

1. **A. trinervia**, Linn. Plantain-leaved Sandwort. E. B. 1483. *A. trinervis*. L. C. 182. *Moehringia trinervia*, Clair. Stems usually numerous, slender, branched and spreading widely, hairy; hairs short, deflexed. Leaves ovate, pointed, the lower with broad tapering petioles, the upper nearly sessile, hairy and ciliated, with three-five principal nerves. Flowers on long pedicels, in a leafy cyme; pedicels spreading and curved downwards after flowering. Sepals lanceolate, acute, with a thick, herbaceous, ciliated, or rough keel, and broad scarious margins. Petals shorter than the calyx. Hedges. Annual. May.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—46°.

SECT. II.—Seeds shagreened, without an aril.

2. **A. serpyllifolia**, Linn. Thyme-leaved Sandwort. E. B. 925, L. C. 178. Root fibrous, branching. Stems very numerous from one root, spreading, branching, with short rough hairs. Leaves small,

ovate-pointed, sessile, nerved. Flowers in forked cymes, usually numerous. Sepals lanceolate, one-three-nerved, scarious at the margin. Petals shorter than the sepals. Dry sandy places. Annual. May.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—200 yards. T. 52°—46°.

3. **A. ciliata**, Linn. Fringed Sandwort. E. B. 1745, L. C. 176. Stem simple, slender, three-four inches high. Leaves obversely lanceolate, sessile, *tapering and fringed at the base*. Flowers solitary, on hairy stalks. Calyx smooth. Petals longer than the calyx. Scottish and Irish mountains. Perennial. July, August. Hibernian.

4. **A. norvegica**, Gunn. Norwegian Sandwort. E. B. 2852, L. C. 177. Stems several, very slender, erect, branching, only a few inches high. Leaves obovate, fleshy, with a short point, *not ciliated*. Sepals herbaceous, more or less keeled, obscurely *three-ribbed*. Petals slightly longer than the calyx. Capsule longer than the calyx. Seeds few, round, tuberculate, brown. Unst, Shetland. Perennial. July.

A. 1, C. 1. Lat. 60°—61°. Alt. 0—100 yards. T. 46°—45°.

XIV. **Stellaria**, Linn. Stitchwort. Annual and perennial plants, with lanceolate, or linear, or ovate and sharply pointed leaves. Flowers white, lateral, or in cymes. Sepals five. Petals five, cleft, or parted. Stamens ten, or fewer. Styles three. Capsule opening by six valves.

1. **S. media**, With. Common Chickweed. E. B. 537, L. C. 185. Stems diffuse, or prostrate and rooting, succulent, brittle, smooth, except an alternate hairy line (not continuous). Leaves *petioled, ovate, shortly pointed*, upper ones tapering at the base, and sessile or nearly so. Flowers in leafy cymes. Sepals *ovate, hairy*. Petals deeply-parted, *scarcely so long as the calyx*. Fruit ovate, longer than the calyx. Seeds large, beautifully and regularly tubercled. Everywhere. Annual. In flower all the year.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—850 yards. T. 52°—38°.

Var. Stems round, hairy, leafy, very stout, succulent, with the alternate hairy lines. Leaves cordate-ovate, very large, with ciliated petioles; upper leaves sessile. Calyx hairy.

2. **S. nemorum**, Linn. Wood Stitchwort. E. B. 92, L. C. 184. Stems ascending, round, hairy, brittle, with a tough, elastic, central part. Leaves *cordate, petiolate, upper ovate*, and almost sessile; *all acuminate and with prominent nerves*, rough, ciliate. Flowers in forked panicles. Sepals with narrow, scarious margins. Petals twice as long as the sepals, parted. Fruit longer than the calyx. Moist woods, Yorkshire, &c. Perennial. June, July.

A. 12, C. 30. Lat. 51°—58°. Alt. 0—150 yards. T. 49°—46°.

Note.—In this species, the leaves on the barren shoots differ much both in shape and size from those on the flowering stems.

3. **S. Holostea**, Linn. Greater Stitchwort. E. B. 511, L. C. 186. Root tufted, with branching scions. Stems reclining at the base, ascending, glabrous, slightly rough at the angles. Leaves somewhat *coriaceous*, sessile, linear-lanceolate, *very sharp pointed*, with

rough edges. Cyme many-flowered, terminal; bracts herbaceous, with ciliated margins. Sepals lanceolate, pointed, glabrous. Petals cleft, pure white, *twice as long as the calyx*. Hedges. Perennial. May.

A. 18, C. 80. Lat. 50°—60°. Alt. 0—650 yards. T. 51°—41°.

S. scapigera, Willd. Many-stalked Stitchwort. E. B. 1269. Stems shorter than the flower-stalks. Leaves roughly ciliated. Calyx as long as the petals. Mountains of Scotland. "No wild specimens are known."—Mr. Babington.

4. *S. glauca*, With. Glaucous Stitchwort. E. B. 825, L. C. 187. Roots tufted, branching, producing leafy, barren shoots. Stems about a foot high, reclining and rooting at the base, four-angled, solid, branching, glabrous, smooth. Leaves linear-lanceolate, reflexed, and *smooth at the edges*. Flowers moderately large, in terminal cymes; *bracts scarious, not ciliated*. Sepals lanceolate, acute, smooth, with prominent nerves. Petals parted to the claw, *twice as long as the calyx*. Grassy ponds and ditches. Perennial. June, July.

A. 12, C. 40. Lat. 50°—56°. Alt. 0—100 yards. T. 51°—47°.

5. *S. graminea*, Linn. Grassy-leaved Stitchwort. E. B. 803, L. C. 188. Roots tufted, branching, producing creeping shoots. Stems reclining at the base, four-angled, smooth, glabrous. Leaves leathery, sessile, *linear-lanceolate, ciliate-scarious at the base*. Flowers in a forked, terminal cyme. *Bracts scarious, ciliated*. Sepals lanceolate, acute, glabrous. Petals deeply-parted, shorter than the calyx or about equal to it. Pastures and bushy places. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—450 yards. T. 52°—42°.

6. *S. uliginosa*, Murr. Bog Stitchwort. E. B. 1074, L. C. 189. Stems prostrate at the base, ascending, diffuse, weak, glabrous. Leaves glaucous, oblong-lanceolate, slightly ciliate at the base. Sepals lanceolate acute, with white, scarious margins. Petals deeply divided, *with spreading lobes, shorter than the sepals*. The flowers of this pretty little palustral species are very shy of disclosing their beauties. They open only when the atmosphere is very dry. Then the sepals and petals spread horizontally, or are somewhat deflected from the horizon towards the ground; the petals, which are parted to the base (claw), have their divisions very divergent at their apices. In ditches and watery places. Annual. June—August.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1100 yards. T. 52°—36°.

XV. *Moenchia*, Ehrh. Annual, erect, sometimes minute plants, with linear-lanceolate, glaucous leaves. Sepals four, erect. Petals four, entire or slightly notched. Stamens four. Capsule opening, with eight-ten teeth.

M. erecta, Ehrh. *Sagina erecta*, Linn. E. B. 609, L. C. 166. Stems solitary or several, simple or forked. Leaves linear-lanceolate, glabrous and glaucous. Flowers terminal, usually solitary, with slightly scarious bracts. Pedicels erect, long. Sepals acute, broadly scarious at their edges. Petals shorter than the calyx. Sandy, bare, open places. Annual. April, May.

A. 12, C. 40. Lat. 50°—55°. Alt. 0—400 yards. T. 52°—45°.

XVI. *Cerastium*, Linn. Mouse-ear Chickweed. Annual or perennial, caespitose, herbaceous plants. Leaves ovate or elliptical, rarely lanceolate, quite entire, sessile, and connate at the base. Flowers axillary and terminal, in forked cymes. Sepals five-four, membranous at the edges. Petals five-four, cleft or notched. Stamens ten, five-four. Styles five, rarely four. Capsule one-celled, membranous, opening with twice as many teeth as there are styles.* Seeds numerous.

1. ***C. triviale*, Link.** *C. viscosum*, Sm. Narrow-leaved Mouse-ear Chickweed. E. B. 790, L. C. 193. Root fibrous. Stems several, spreading, or sometimes prostrate, erect only at the top, or when supported by other plants, long, round, densely hairy, hairs rarely glandular, forked near the summit, with a single flower in the angle. Leaves very dark green, half embracing the stem, the lower oblong, the upper ovate. Bracts short. The cyme is repeatedly forked, and the flower in the angle of the bifurcation has a long, diverging, or reflex stalk. The sepals are densely hairy, acuminate and scarious at the tips and margins, scarcely so long as the petals. Petals scarious, rather deeply cleft, with narrowish blunt lobes. Fruit conical, obtuse, more or less incurved, crowned by the stigmas. In grassy places, waysides, and meadows. Perennial(?). April—September.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1200 yards. T. 52°—35°.

2. ***C. semidecandrum*, Linn.** Little Mouse-ear Chickweed. E. B. 1630, L. C. 194. Bracts membranous above, *denticulate*. Pedicels much longer than the calyx, *refracted after flowering, then erect*. Sepals lanceolate, with a broad, white, shining margin. Petals rather notched than cleft. Stamens five, rarely ten. Smith asserts that it is a most distinct species, and is out of flower before *C. triviale* begins to put forth its less conspicuous flowers. On walls and in sandy, open places. March—May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—100 yards. T. 50°—46°.

3. ***C. glomeratum*, Thuill.** *C. vulgatum*, Sm. Broad-leaved Mouse-ear Chickweed. E. B. 789, L. C. 192. Stems solitary or several, spreading-ascending or erect, covered with soft hairs, sometimes glandulous. Leaves ovate; bracts herbaceous, all hairy. Pedicels of the solitary flowers in the forks seldom longer than the flowers themselves, spreading or reflexed. Sepals erect, tapering, pointed, scarious at the tips and margins. Petals scarcely longer than the sepals, or nearly as long. Fruit longer than the calyx, scarious, striated. Meadows, roadsides, walls. Annual. April.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—43°.

Var. Stems simple, erect; leaves obovate, densely hairy, hairs long. Petals mostly wanting. Stamens few. On walls and dry places.

4. ***C. tetrandrum*, Curt.** Four-cleft Mouse-ear Chickweed. E. B. 166, L. C. 194*. Curtis's Fl. Lond. 31. Stems several, spreading or procumbent, branched, forked, densely hairy. Leaves elliptical-oblong, the upper leaves ovate. Peduncles erect, longer than the

* This is also characteristic of *Alsine*, *Cherleria*, *Arenaria*, *Holosteum*, (*Sagina*?).

two, I believe (presumably
I. L. C. semidecandra
which seem to run
another. As it is of
the use examining this
about when dry, I include
some specimens

In haste

Yours very truly

J. S. Kille

calyx, glandular. Sepals four, lanceolate, sharp-pointed, with long hairs, and broad, scarious margins. Petals four, longer than the sepals, cleft. Stamens and styles four, respectively, rarely five. Capsule longer than the calyx, with eight teeth. The number of the sepals, petals, stamens, styles, and calyx-teeth is not constant, but the plant may generally be distinguished from *C. semidecandrum* by its tapering sepals, more deeply cleft petals, and by its nearly straight capsule being only slightly longer than the calyx. It is also later in flowering. Sandy sea-coasts, walls, &c. Annual. May, June.

For area, &c., see *C. semidecandrum*.

5. *C. alpinum*, Linn. Alpine Mouse-ear Chickweed. E. B. 472, L. C. 196. Root creeping, producing tufts of round, leafy stems, a few inches high. Leaves oblong or ovate, sessile, more or less pubescent or woolly. Flowers few. Bracts herbaceous. Sepals elliptical, scarious at the margins, hairy or woolly. Petals much longer than the calyx. Capsules conical-cylindrical, curved, longer than the calyx. Seeds small, acutely tubercled. North Wales; Highlands of Scotland. Perennial. June.

A. 5, C. 12. Lat. 53° — 59° . Alt. 850—1300 yards. T. 38° — 34° .

6. *C. latifolium*, Linn. Broad-leaved Alpine Chickweed. E. B. 473, L. C. 197. Stems ascending, tufted, leafy, mostly simple; barren shoots procumbent, branching, densely hairy; hairs woolly, long, white. Leaves elliptical, bluntly pointed. Flowers solitary or several. Sepals with a slight membranous border. Mountains in Wales and Scotland. Perennial. June, July.

A. 4, C. 8. Lat. 53° — 59° . Alt. 0—1250 yards. T. 37° — 34° .

The distinctive characters of the two latter species are very obscure or minute. In *C. latifolium* the stems are more tufted and closer than in *C. alpinum*, and are usually one-flowered; the leaves are shorter, more elliptical, and more evidently pointed than they are in the kindred species; the hairs, which are quite as numerous in *C. latifolium* as in *C. alpinum*, have a more rusty or yellowish hue than in its congener.

7. *C. trigynum*, Vill. *Stellaria cerastoides*, Linn. Alpine Stitchwort. E. B. 911, L. C. 190. Root rather widely creeping. Stems diffuse, three-six inches long, marked with a hairy line, and terminating with about two flowers; usually producing a barren lateral shoot (?). Leaves linear-lanceolate, entire, smooth. Peduncles long, swollen, and hairy above. Sepals with a hairy keel. Petals cleft, longer than the calyx. Styles usually three. Capsule cylindrical, twice as long as the calyx, with twice as many teeth as there are styles. Seeds rough. Mountains of Braemar. Perennial. June—September.

A. 2, C. 4. Lat. 56° — 58° . Alt. 900—1300 yards. T. 36° — 34° .

8. *C. arvense*, Linn. Field Chickweed. E. B. 93, L. C. 195. Stems numerous, reclining, matting and rooting below, ascending above, six-twelve inches high, hairy or downy. Leaves lanceolate-linear. Flowers few, white. Bracts herbaceous, with scarious edges. Pedicels longer than the leaves. Sepals with broad scarious margins. Petals cordate, twice as long as the calyx. Fruit cylindrical, about

as long as the calyx. Seeds few, with prominent tubercles. Gravelly and chalky places. Perennial. June.

A. 12, C. 30. Lat. 50°—58°. Alt. 0—100 yards. T. 50°—46°.

Var. *β. strictum*. Plant glabrous. Ireland and Isle of Arran.

XVII. *Malachium*, Fr. Aquatic plants, with weak, straggling stems and rather large white flowers. Sepals five, ovate, acute, hairy. Petals five, deeply-parted. Stamens ten. Styles five, alternate with the sepals. Capsules ovate, opening with five bidentate (two-toothed) valves, which are opposite to the sepals.

***M. aquaticum*, Fr. *Cerastium aquaticum*, Linn.** Water Chickweed. E. B. 538, L. C. 191. Stems numerous, succulent brittle, decumbent, or prostrate-ascending, branching, round, smooth below, hairy-glandular above. Leaves glabrous, sessile, ovate-tapering, some of them slightly cordate at the base. Pedicels rather longer than the floral leaves, hairy-glandular, spreading or reflexed after flowering. Sepals spreading, blunt, herbaceous, glandular. *Petals parted to the claw, with spreading divisions*, rather longer than the sepals. Capsule slightly longer than the calyx, ovate, straight, opening by ten teeth. In water and in wet and dry places near water.

A. 10, C. 40. Lat. 50°—55°. Alt. 0—100 yards. T. 51°—47°.

ORDER CXVII.—**FRANKENIACEÆ**, St. Hil. THE SEA-HEATH FAMILY.

Annual, biennial, or perennial, decumbent, shrubby, or herbaceous plants, with entire leaves and solitary, regular flowers. Calyx gamosepalous, tubular, four-five cleft, persistent, with equal lobes. Petals four-five, with a membranous claw. Stamens four-six, rarely five; filaments persistent, embracing the ovary; anthers extrorse. Ovary angular, one-celled, with three-four parietal placentas; ovules in two rows. Style simple, with three-four stigmas. Capsule one-celled, with three-four valves. Seeds rough, with a coriaceous testa, and umbilicate at the base. Embryo straight, surrounded by the perisperm; radicle short, approaching the hilum.

***Frankenia*, Linn.** Decumbent, mostly shrubby plants, with entire small leaves and small reddish flowers. Calyx cylindrical, angular, toothed. Petals clawed, five, with ovate, spreading limbs. Capsule ovate, furrowed, one-celled, three-four-valved, many-seeded.

1. ***F. laevis*, Linn.** Smooth Sea-heath. E. B. 205, L. C. 142. Root woody. Stems prostrate, wiry, much branched. Leaves linear, revolute, fringed at the base, convex and smooth above (Sm.), with axillary, leafy tufts or short leafy branches. Flowers terminal or axillary, sessile, pink. Petals with a yellow scale attached to the claws. Muddy salt marshes, chiefly on the east coasts of England. At St. Helen's Spit, Isle of Wight. Perennial. August.

A. 3, C. 7. Lat. 50°—53°. Alt. ? T. 51°—49°.

2. ***F. pulverulenta*, Linn.** Powdery Sea-heath. E. B. 2222, L. C. Excluded Species. Stems numerous, prostrate, much branched,

leafy and downy. Leaves obovate, slightly revolute, opposite, or in whorls of four together, smooth above, hoary beneath. Flowers axillary, pale red. Said to have been found on the southern coasts. Annual. July.

ORDER CXVIII.—**TAMARIXACEÆ**, Desv. *Tamariscaceæ*.
Tamariscineæ. THE TAMARISK FAMILY.

Shrubs or herbs, with alternate, entire, scale-like leaves. Flowers spiked or clustered. Calyx four- or five-parted, persistent. Petals inserted into the base of the calyx, withering. Stamens equal in number to the petals, or twice as many. Ovary one-celled. Style very short, with three stigmas. Fruit capsular, three-valved, with loculicidal dehiscence and many seeds.

Tamarix, Linn. Tamarisk. Shrub, with slender, pliant, branching stems, and minute, fleshy, sessile leaves. Inflorescence in dense, lateral, and terminal racemes. Calyx monosepalous. Segments five, erect, permanent. Petals five, spreading. Stamens five, opposite to the segments of the calyx. Anthers roundish, incumbent. Ovary ovate, with three revolute, downy, sessile stigmas. Fruit capsular, triangular, one-celled, three-valved, with numerous seeds. Seeds with a stalked, feathery crown.

T. anglica, Webb. Tamarisk. L. C. 392. Journal of Bot. iii., 429, t. 15. Stem shrubby, slender, tapering, branching. Branches erect or drooping, leafy. Leaves ovate, pointed, minute, imbricated, smooth, with a spur at the base. Flowers on lateral and terminal cylindrical clusters; clusters panicle. Flowers small, reddish, or white. Fruit capsular, roundish, pointed, somewhat angular at the base. Shrub. July.

T. gallica, Sm. E. B. 1318. Leaves broader at the base, capsule with a more tapering point than in *T. anglica*. A species of this plant is partially naturalized about Yarmouth. Isle of Wight.—A. I.

Alien.

ORDER CXIX.—**BERBERIDACEÆ**, Vent. THE BERRY FAMILY.

Shrubs or herbaceous plants. Leaves compound, alternate. Sepals three-four-six, deciduous. Petals either equal in number to, or double the number of the sepals. Stamens as many as the petals and

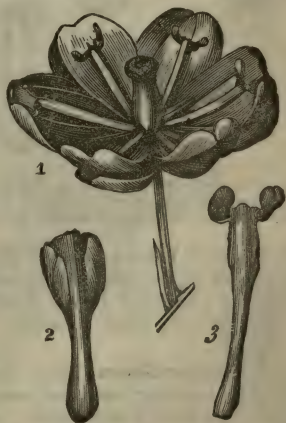


Fig. 206.—*Berberis vulgaris*. 1, Entire flower; 2, stamen, with the cells shut; 3, the same, with the cells open. All magnified.

opposite to them. Ovary solitary, one-celled, containing two-twelve ovules. Fruit fleshy or dry, with few seeds.

SYNOPSIS OF THE GENERA.

Berberis. Sepals, petals, and stamens six, respectively.

Epimedium. Sepals, petals, and stamens four, respectively.

I. *Berberis*, Linn. Berberry. Shrubs, with alternate, stalked, simple or pinnate, serrated leaves. Inflorescence racemose. Calyx with



six sepals, coloured, deciduous. Petals six, opposite to the sepals, and attached to their base. Anthers two-lobed, opening by a valve from the bottom upwards. Ovary elliptic-oblong, with a sessile, orbicular stigma, which is broader than the ovary. Fruit an oblong berry, one-celled, with two or three oblong seeds attached by short funiculi to the lower part of the cell.

B. vulgaris, Linn. Common Berberry. E. B. 49, L. C. 401, 5th ed., 35. A small tree, with yellow wood and cinereous bark.

Leaves obovate or oblong, fringed, with spinous cilia. Berries vivid orange, acid, terminated by the stigma. Hedge-tree. Flowers in May and June. Fruits in August and September.

A. 16, C. 40. Lat. 50°—57°. Alt. 0—150 yards. T. 51°—46°.

II. *Epimedium*, Linn. Barrenwort. Stem herbaceous, with a perennial creeping root and compound leaves, with cordate leaflets, which have bristly serratures. Calyx and corolla composed of four pieces respectively, opposite each other; the former deciduous, the latter with pouch-like scales at their base. Stamens four. Anthers with a peculiar attachment, situated below the summit of the filaments, and opening, as in *Berberis*, by a valve, which bursts from the bottom and rolls back. Ovary elliptic-oblong, with a furrow at the back. Style

oblique. Stigma simple. Fruit an oblong pod, one-celled, two-valved, with numerous unilateral, oblong seeds.

E. alpinum, Linn. Alpine Barrenwort. E. B. 438, L. C. 3rd ed. 402,* 5th ed. Excluded Species. Stems round, erect, leafy only at the top. Leaves biternate. Leaflets ovate, cordate at the base, with slender, horizontal teeth. Flowers panicle (branching cluster), on hairy glandular pedicels. Calyx pale red. Petals yellow, nectary-shaped. In mountain thickets. A doubtful native (?). Perennial. May.

A. 7.

ORDER CXX.—**RANUNCULACEÆ**, D.C. THE CROW-FOOT FAMILY.

Herbaceous, rarely half-shrubby or woody plants, containing a more or less acrid juice. Leaves usually alternate, simple or compound, with a dilated and sheathing petiole. Flowers solitary, terminal or lateral, in more or less irregular cymes, clusters, or panicles, imbricated in prefloration. Sepals three-fifteen, free, often coloured and deciduous or herbaceous and permanent. Petals five-fifteen, usually free, caducous, regular or irregular, rarely absent. Stamens indefinite (*Myosurus* five-ten). Anthers usually extrorse. Ovary free, carpels indefinite, or two-ten, rarely a single carpel. Carpels free or coherent at or near the base, with one or several ovules. Styles free. Stigmas entire. Fruit an aggregation of one-seeded dry carpels, not opening, or of several-seeded follicles, opening by the ventral suture, rarely a single fleshy, indehiscent carpel. Seeds ascending or pendulous. Embryo straight, very small, in a thick, horny albumen. Radicle towards the hilum.

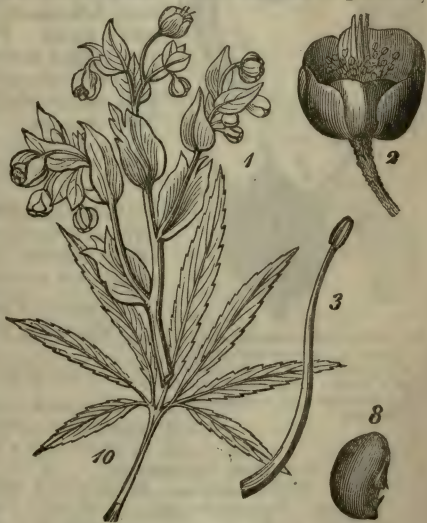


Fig. 207.—*Helleborus foetidus*. 1, Flowering branch; 2, flower; 3, stamen; 4, entire seed; 5, leaf.

TRIBE I.—**Clematideæ** Leaves opposite; corolla absent;

* 401 and 402 are unappropriated places in the 5th ed. L. C.

prefforation valvular; carpels indefinite in number, one-seeded, not opening.

Genus.—*Clematis*.

I. Clematis, Linn. Traveller's Joy. Stems usually shrubby and climbing, rarely herbaceous and erect. Leaves opposite, decompound, often with twining footstalks. Flowers axillary or terminal, paniced, rarely solitary. Perianth single, in four-eight pieces, valvate in æstivation. Stamens and pistils indefinite. Fruit numerous, ovate, compressed *achenia*, on a capitate receptacle, each terminating in a long feathery tail.

C. Vitalba, Linn. Virgin's Bower. E. B. 612, L. C. 1. Stems woody, climbing, angular, furrowed. Leaves pinnate, on rigid, diverging petioles. Leaflets ovate-lanceolate, on longish, more or less coiled stalks. Flowers in axillary panicles, turned to one side. Sepals densely downy, almost shaggy externally. Hedges; in chalky places. Perennial. July, August.

A. 6, C. 30. Lat. 50° — 53° (55° ?). Alt. 0—200 yards. T. 52° — 48° .

TRIBE II.—**Ranunculeæ**. Leaves alternate or radical. Petals uniform, rarely absent. Carpels indefinite, one-seeded, not opening.

Genera.—*Thalictrum*, *Anemone*, *Adonis*, *Myosurus*, *Ranunculus*, *Ficaria*.

SYNOPSIS OF THE GENERA.

Thalictrum. Perianth single. Sepals usually four, shorter than the stamens.

Anemone. Perianth single. Flowers with a leaf-like involucre. Sepals five-fifteen, longer than the stamens.

Adonis. Perianth double. Petals with a nectariferous pore at the base.

Myosurus. Stamens five-ten. Petals with a tubular claw.

Ranunculus. Sepals and petals usually five, respectively.

Ficaria. Sepals three. Petals indefinite.

II. Thalictrum, Linn. Meadow Rue. Perennial, glabrous plants, with rigid, upright, often fistular stems, repeatedly compound leaves and racemose flowers. Perianth single, in four or five pieces, imbricate in prefforation (æstivation). Stamens and pistils indefinite. Stigmas sessile, downy. Carpels (*achenia*) ovate, furrowed without a terminal appendage. Seeds pendulous.



Fig. 207.—*Helleborus foetidus*. 4, A petal; 5, the three carpels composing the fruit; 6, section of a carpel; 7, fruit opening by the inner side; 9, section of entire seed.

1. **T. minus**, Linn (?). Small Meadow Rue. L. C. 3. Stems slender, striated, zigzag, *leafless at the base*. Leaflets ternate, truncate, with three broad teeth, or ovate pointed, more or less glaucous below; stipules very short or wanting. Panicle lax, pyramidal; branches at the base, long, and gradually shortened, all spreading. Flowers *distant, drooping*, on long pedicels. Stamens *drooping*. Anthers after the emission of the pollen with a curved point. Carpels tapering, eight-ribbed. Alpine pastures. Perennial. July.

A. 17, C. 50. Lat. 50°—59°. Alt. 0—650 yards. T. 52°—41°.

The specimen from which the above description was drawn up grew at Gordale, near Malham, Yorkshire.

2. **T. flexuosum**, Reich. Flexuous-stalked Meadow Rue. L. C. 3*. Stem zigzag, striated, branched, *leafy to the base*. Stipules with *reflexed auricles*. Leaves bi-tripinnate, leaflets three-five-cleft, paler beneath. Petioles with *patent divaricate branches*. Panicle leafy, elongated with patent, often reclinate branches. Flowers drooping, carpels narrowly oblong, sub-compressed, sub-ten-ribbed, gibbous within, upwards. *T. majus*, Sm. E. B. 611. Eng. Fl., iii., 42.

3. **T. saxatile**, D. C. Rock Meadow Rue. L. C. 3*. Stem zigzag, smooth, but striated below the striated sheaths, branched, hollow, *leafy to the base*. "Stipules with horizontal auricles," Fries. Leaves bi-tripinnate; leaflets three-five-cleft, paler beneath. Petioles subterate, with patent, *not divaricate, branches*. Panicle leafless, *erect pyramidal*, with patent straight branches. Flowers drooping. Carpels *regularly oval*.

These descriptions (2 and 3) are copied verbatim from the "Phytologist," vol. iv., p. 938. They originally appeared in the "Ann. Nat. History," No. 64, for April, 1853. They were drawn up by Mr. Babington. Their localities, area, range, &c., are not yet determined.

4. **T. alpinum**, Linn. Alpine Meadow Rue. E. B. 262, L. C. 2. Stem erect, three-six inches high, quite smooth and simple, with usually one leaf. Leaves biternate or bi-tripinnate, on slender erect petioles; *leaflets trifid, wedge-shaped at the base*, shining above, hoary or glaucous beneath, with reflexed edges. Flowers in terminal lax clusters, on filiform stalks. Fruit smooth, tipped with the hooked style. On mountainous and alpine places. Perennial. May—July.

A. 9, C. 20. Lat. 53°—61°. Alt. 0—1300 yards. T. 46°—34°.

5. **T. flavum**, Linn. Common Meadow Rue. E. B. 367, L. C. 4. Root with elongated horizontal rhizomes. Stems erect, grooved, branching, quite smooth. Leaves *bipinnate*, primary and secondary petioles divaricated. Leaflets oblong, wedge-shaped, lobed at the apex, upper one larger and three-cleft. Panicle *compact*, many-branched. Flowers *yellow*, contiguous, dense, at the summit of the erect branches. Stamens erect, or nearly so. Carpels ovate or oblong, ribbed and crowned with the permanent style. Meadows and riversides. Perennial. July.

A. 15, C. 50. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—47°.

III. **Anemone**, Linn. *Anemone*. Perennial herbaceous plants, with tuberous roots and radical flower-stalks. Leaves more or less compound petiolate. Perianth single, with five-nine pieces, subtended by a leafy-like involucre. Stamens and pistils indefinite; styles short. Carpels numerous, on a thickened receptacle, forming a round or oblong head, sometimes tipped with the elongated persistent styles, which become feathery or downy appendages to the fruit.

1. **A. Pulsatilla**, Linn. Wind Flower. E. B. 51, L. C. 5. Root thick, woody, oblique, more or less branching. Stems round, cylindrical, hairy or woolly, one-flowered. Leaves radical, bipinnate, with linear pointed leaflets (segments). Segments of the involucre linear, very hairy. Flowers solitary, erect, or slightly drooping, bluish violet- or rose-colour. Sepals covered with silky hairs externally, oblong or lanceolate, erect below, spreading, curved above. Carpels downy or silky, with long, feathery tails. Chalky and limestone pastures. Perennial. May.

A. 5, C. 10. Lat. 51°—54°. Alt. 0—200 yards. T. 49°—47°.

2. **A. nemorosa**, Linn. Wood Anemone. E. B. 355, L. C. 6. Roots horizontal, slender, branching, very long. Stems one-flowered, solitary. Root-leaves (sometimes wanting) on long stalks, ternate or quinate, with petiolate leaflets. (Barren stems?) Involucre like the leaves, petiolate, with three petiolate, incised leaflets. Flowers white or slightly rosy, inclining. Sepals glabrous, roundish. Carpels downy, spreading, with a longish incurved beak. Woods. Perennial. March, April.

A. 17, C. 80. Lat. 50°—58°. Alt. 0—950 yards. T. 52°—38°.

3. **A. apennina**, Linn. Blue Mountain Anemone. E. B. 1062, L. C. 7. Roots tuberous, roundish. Stems erect, furrowed, hairy, leafless, except in the middle, where the leaf-like involucre is situated. Root-leaves biternate. Involucre trifoliate. Leaves ternate; leaflets incised, with a triangular outline. Flowers solitary. Sepals lanceolate, blunt, spreading, *blue*. Carpels pointed, tailless. Naturalized (?). It is spontaneous in Wimbledon Gardens. It is not now known to grow in the Park, but the Wild Tulip is. Perennial. April.

Alien.

4. **A. ranunculoides**, Linn. Yellow Anemone. E. B. 1484, L. C. 8. Roots rhizomatous, long, slender. Stems one-two-flowered. Root-leaves as in *A. nemorosa*. Involucral leaves *sub-sessile*. Flowers *erect, yellow*. Moist mountainous places. Perennial. April, May.

Naturalized (?). This species is reputed British on slender authority.

IV. **Adonis**, Linn. Pheasant's-eye. Annual or perennial plants. Stems branched. Leaves linear or almost setaceous. Flowers solitary, terminal. Sepals five, coloured, converging, obtuse. Petals five-fifteen, oblong, obtuse, with claws. Carpels numerous, on a

cylindrical receptacle, gibbous, angular, beaked with the persistent style.

A. autumnalis, Linn. Common Pheasant's-eye. E. B. 308, L. C. 9. Stems erect, branching, smooth and shining. Leaves bi-tripinnate, ultimate divisions linear or setaceous, channelled, and somewhat fleshy. Sepals dark purple, spreading. Petals scarlet, glossy, toothed at the summit, finely ribbed behind, obovate, concave, connivent. Corn-fields, near Dartford, Kent. Annual. June—September.

A. 3, C. 8. Lat. 50°—53°. Alt. 0—100 yards. T. 51°—48°.

V. Myosurus, Linn. Mouse-tail. Annual small plants. Leaves radical, linear, entire. Sepals five, spurred at the base. Petals five, very small, tubular at the base, with an obliquely dilated limb. Stamens five or more. Carpels oblong-acute, very numerous, closely imbricated, on a very long, filiform receptacle, terminated by the persistent style.

M. minimus, Linn. Least Mouse-tail. E. B. 435, L. C. 10. Stalks filiform, three-five inches high, numerous, erect, gradually enlarged upwards. Leaves in tufts, numerous, erect, linear. Spurs of the sepals closely applied to the stalk. Carpels four-angled, in a long, slender, tapering spike. Corn-fields. Annual. May.

A. 10, C. 30. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

VI. Ranunculus, Linn. Crowfoot. Mostly perennial, smooth, or hairy plants. Stems round, branching, generally upright. Flowers terminal, lateral or axillary. Sepals five, rarely three, deciduous. Petals commonly five, rarely more, or fewer; obtuse or obcordate, with short claws, and a pore at the base, in several species covered by a scale. Carpels numerous in a globular head, each tipped with a point or hook. Seed erect.

SECT. I.—*Batrachium*, Fries. Aquatics, either submersed or swimming. Petals white, with a yellow claw, and without a cover to the pore. Carpels wrinkled across, without a rim.

1. R. hederaceus, Linn. Ivy-leaved Crowfoot. E. B. 2003, L. C. 13. Stem prostrate, rooting at the joints. Leaves on long petioles, opposite to each other or to the flower-stalks, reniform, three-five-lobed; lobes rounded, slightly notched. Petals very small, oblong or ovate, scarcely longer than the sepals. Carpels smooth, blunt, without a point. Boggy places and in ditches. Perennial. May—September.

A. 18, C. 80. Lat. 50°—59°. Alt. 0—800 yards. T. 51°—41°.

2. R. cœnosus, Guss. L. C. 12. Stem and leaves as in the preceding, only the latter organs are more deeply incised with cuneate lobes. The flowers are larger than in *R. hederaceus*. Carpels pointed, with the persistent style. Muddy places. Perennial. May—September.

A. 14, C. 60. Lat. 50°—55°. Alt. 0—200 yards. T. 50°—47°.

3. **R. aquatilis**, Linn. Water Crowfoot. E. B. 101(?), L. C. 11. Stems swimming. Leaves all uniform or differing; the lower many-parted, setaceous, spreading in all directions as in *R. tripartitus*, the upper sometimes dilated, and three-five-parted. Petals obovate, usually *much longer than the calyx*. Carpels hairy, rarely glabrous. Ditches, ponds, &c. Perennial. April—July.

A. 18, C. 81. Lat. 50°—60°. Alt. 0—350 yards. T. 52°—43°.

4. **R. tripartitus**, D. C. Three-parted-leaved Crowfoot. L. C. 11.* Stems usually swimming. Lower leaves much divided, with the capillary segments *spreading in all directions*; the upper leaves reniform, deeply three-five-parted. Petals *small, oblong, scarcely longer than the calyx*. Carpels glabrous when ripe, *scarcely mucronulate*. Ditches and stagnant pools. Perennial. May—July.

Area, &c., undetermined (?).

Under *R. aquatilis*, the "London Catalogue," 5th ed., includes the following varieties, deemed species by some botanists, viz., a. *heterophyllus*, Fr.; b. *peltatus*, Fr.; c. *floribundus*, Bab.; d. *trichophyllus*, Chaix.; e. *Drouettii*, F. Schultz. All the others enumerated below are retained. The genus *Ranunculus* is likely soon to attain the unenviable notoriety of the *Salices*, *Rubi*, *Hieracia*, &c.

5. **R. Baudotii**, Godr.; *confusus*. L. C. 11*. Stem stout, cylindrical, smooth. Leaves, except the uppermost ones, all setaceous, repeatedly forked. Upper leaves three-lobed, flat; lobes linear or cuneate, blunt. Fruit very compact, ovate, conical, umbilicate or cordate at the base (the shape is almost exactly that of a strawberry). Carpels wrinkled, smooth, winged. Sussex, Hants. Perennial (?).

6. **R. fluitans**, Lam. Floating Water Crowfoot. E. B. 2870, L. C. 11*. Stems long, floating or submersed, very variable in length, repeatedly forked. Leaves all submersed, on long stalks, much divided, segments often very long, forked, setaceous, approximate, almost parallel. Petals five-twelve, large, white, much exceeding the sepals. Carpels (?) glabrous. In running and standing water. Perennial. May—August.

A. 14, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

Var. *β. terrestris*. Segments of the leaves shorter, thickened and enlarged at the apex. Sandy shallow places by river-sides.

Var. *γ. heterophyllus*. Upper leaves floating, three-five-parted, deeply incised, with cuneate segments. Coss. and Germ., Fl. Par. (?). Found in England (?).

7. **R. circinatus**, Sibth. Round-leaved Water Crowfoot. E. B. 2869, L. C. 11*. Stems floating or more or less under water (submersed). Leaves sessile, much divided, segments setaceous or capillary, repeatedly forked, rigid, spreading in one plane (not divaricate like *R. aquatilis*), and with a circular outline, and maintaining their position when taken out of the water. Petals obovate, longer than the sepals. Carpels usually hispid. Ditches and stagnant water. Perennial. June—August.

A. 14, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

SECT. II.—*Ranunculus*, Fries. Terrestrial or aquatic, never floating, plants. Petals yellow, rarely white; pore covered with a scale. Carpels smooth or tubercular, rarely wrinkled, surrounded with a compressed rim.

§ 1. Leaves entire.

8. **R. Lingua**, Linn. Spear-leaved Crow-foot. E. B. 100, L. C. 16. Root bearing stolons. Stem erect, round, hollow, smooth, simple, leafy. Leaves *lanceolate-elongate*, nearly sessile, attenuated below, slightly and laxly toothed, glabrous above, slightly downy below. Calyx downy, very fugacious. Petals large, shining. Fruit smooth, with a stout beak, and a rim which is flattened only on the inner side. Fen-ditches. Norfolk, &c. Perennial. July.

A. 15, C. 60. Lat. 50°—58°. Alt. 0—200 yards. T. 51°—47°.

9. **R. Flammula**, Linn. Lesser Spearwort. E. B. 387, L. C. 15. Root branching, with more or less oblique rhizomes. Stems ascending, spreading, or prostrate and rooting at the base, hollow, glabrous, with some downy hairs above. Leaves glabrous, entire or toothed, with a prominent mid-nerve; the radical leaves *on long petioles, ovate or oblong*, sometimes cordate at the base; stem-leaves lanceolate-linear, tapering into a petiole or nearly sessile. Calyx downy, with close hairs. Carpels smooth, with a short beak. Watery places. Perennial. June.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards. T. 52°—38°.

Sub-var. *reptans*. Stem prostrate, rooting, almost through its whole extent.

10. **R. ophioglossifolius**, Vill. *Ophioglossum*-leaved Crow-foot. E. B. 2833, L. C. 17. Root annual. Stem six-twelve inches high, erect, hollow, glabrous. Lower leaves *cordate-ovate, stalked*. Upper leaves oblong, sessile, clasping. Carpels tubercled, with a terminal point. St. Peter's Marsh, Jersey. Annual. June.

Sarnian.

§ 2. Leaves lobed or incised.

† Plants perennial. Carpels smooth, or almost so.

11. **R. auricomus**, Linn. Wood Crowfoot. E. B. 624, L. C. 18. Stems solitary or several, erect or ascending, nearly glabrous. Leaves *glabrous, or nearly so*; root-leaves on long stalks, *roundish-reniform*, lobed and crenulate; stem-leaves palmate, with five-seven divergent, linear lobes, sessile. Calyx erect. Carpels *pubescent*, with a hooked beak. Woods, &c. Perennial. May, June.

A. 16, C. 70. Lat. 50°—58°. Alt. 0—500 yards. T. 51°—42°.

12. **R. acris**, Linn. Upright Meadow Crowfoot. E. B. 652, L. C. 19. Root oblique, producing strong fibres. Stem more or less erect, with ascending hairs. Leaves more or less hairy, the radical ones on long petioles, palmate, usually with five primary segments, or three with the lower pair divided nearly to the base; segments wedge-shaped, with linear pointed lobes or teeth; stem-leaves on short petioles, the upper nearly sessile, with linear, entire, or cut segments. Peduncles long, round, *not furrowed*. Calyx erect or

slightly spreading. Carpels smooth, with a curved beak. Pastures. Perennial. May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1300 yards. T. 52°—34°.

13. **R. repens**, Linn. Creeping Crowfoot. E. B. 516, L. C. 20. Root strong, with vertical, seldom oblique fibres. Stems rough, with deflexed hairs, some ascending, others reclining, prostrate, rooting. Leaves hairy or smooth, the radical leaves often marked with black patches, on long petioles, ternate, or biternate, the divisions lobed, incised or toothed, the middle and upper division on a longer petiole than the two lateral ones. The stem-leaves are on shorter petioles. Peduncles *strongly furrowed*. Sepals loose, *slightly spreading*. Carpels finely punctate; beak slightly hooked at the top. Receptacle slightly hairy. About ditches, hedges and roadsides. Perennial. May.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—900 yards. T. 52°—38°.

14. **R. bulbosus**, Linn. Bulbous Crowfoot. E. B. 515, L. C. 21. Root *bulbous* (swollen bases of the leaves). Stems solitary or several, erect, hairy or downy, hairs ascending. Leaves hairy, the radical ones on long petioles, in five deeply-parted primary segments, *the middle one on a long petiole*, four lateral, one terminal, all more or less deeply cut, with narrow, acute, secondary segments, or linear lobes or teeth, all pointed. Peduncles grooved, calyx *reflexed*, carpels glabrous, with a curved beak. Meadows and pastures. Perennial. May—August.

A. 17, C. 75. Lat. 50°—58°. Alt. 0—500 yards. T. 52°—42°.

†† Plants annual. Carpels tuberculated, rough or spinous.

15. **R. hirsutus**, Curt. Hairy Crowfoot. E. B. 1504, L. C. 22. Stems diffuse, spreading or ascending, rarely erect, branching from the base, downy or hairy. Root-leaves on long petioles, three-cleft, with incised or toothed lobes; stem-leaves on short petioles, with linear, entire or incised lobes. Calyx reflexed, very fugacious. Carpels numerous, in a round head, much compressed, *surrounded by a green border, with rows of tubercles near the margin*, with a large, straight, or scarcely curved beak. Waste places and fields. Annual. June.

A. 16, C. 60. Lat. 50°—57°. Alt. 0—200 yards. T. 52°—47°.

16. **R. arvensis**, Linn. Corn Crowfoot. E. B. 135, L. C. 25. Stems usually solitary, often branching from the base, almost smooth. Leaves glabrous, or slightly downy, the lower on petioles, the upper sessile, three-parted or three-cleft, with wedge-shaped two-three-cleft segments. Flowers greenish-yellow, not large. Calyx slightly spreading or erect. Carpels large, four-eight, compressed, *surrounded by a thick rim, with long straight spines and tubercles on the sides, with a long, nearly straight beak*. Corn-fields and rubbish. Annual. June.

A. 14, C. 50. Lat. 50°—56°. Alt. 0—200 yards. T. 51°—47°.

17. **R. parviflorus**, Linn. Small-flowered Crowfoot. E. B. 120, L. C. 24. Stems prostrate, branched, leafy, hollow, round, with long, spreading, fine hairs, eight-twelve inches long. Leaves

petioled, roundish-cordate, sharply-notched, three-lobed; upper leaves with long lanceolate entire segments. Calyx erect or reflexed. Petals narrow, obovate, *one or more often defective*. Fruit flat, roundish, *with a border and large curved point*, the sides thickly covered *with small, prominent, hooked prickles*. Gravelly fields and under hedges. South of England. Annual. June.

A. 11, C. 40. Lat. 50° — 55° . Alt. 0—200 yards. T. 52° — 48° .

18. **R. sceleratus**, Linn. Celery-leaved Crowfoot. E. B. 681, L. C. 23. Stems usually solitary, erect, hollow, usually branching; branches erect, forked. Leaves smooth or slightly hairy; lower ones on long stalks, reniform, three-five-lobed or parted, the lobes or divisions crenated or cleft; upper leaves sessile or nearly so, with linear or linear-oblong, entire or cleft segments. Flowers in the forks or terminal. Calyx reflexed, very caducous; petals not so long as the ovaries, without a scale at the base. Carpels *in an oblong, spicate head, small, slightly compressed, with a marginal ring*. Watery places; on mud.

A. 18, C. 75. Lat. 50° — 59° . Alt. 0—200 yards. T. 51° — 47° .

R. cordigerus (?) or *trilobus* (?). Root-leaves cordate lobed; stem-leaves trifid. Flowers on long stalks. Calyx reflexed. Petals about as large as in *R. hirsutus*. Carpels flat, with a broad margin and strongly tubercled ~~carpels~~. Wandsworth steam-boat pier. Annual. July—September.

VII. **Ficaria**, Dill. Pilewort. Stem procumbent, quite smooth, hollow, slightly branched. Leaves kidney-shaped or cordate, on long petioles, either entire or with broad, pointed lobes. Flowers solitary, sometimes on radical peduncles. Sepals three-five, herbaceous or slightly-coloured, deciduous. Petals six-nine, lanceolate, with a pore and scale at the base. Carpels numerous; beak short or none.

F. ranunculoides, Moench. *R. Ficaria*, Linn. Common Pilewort. E. B. 584, L. C. 14. Root tuberous. Stems short, ascending. Leaves thick, shining, more or less crenulate, with broad, obtuse, or pointed lobes, or entire, variable. Peduncles long. Flowers yellow, often green on the exterior. Carpels nearly globular, pubescent or smooth, almost always smooth when ripe. Moist meadows. Perennial. March.

A. 18, C. 82. Lat. 50° — 61° . Alt. 0—800 yards. T. 52° — 41° .

TRIBE III.—**Helleboreæ**. Leaves alternate, or all radical. Calyx and corolla imbricated in prefloration. Calyx coloured, rarely herbaceous. Petals *usually irregular*, rarely absent. Carpels foli-
cles, three-ten, very rarely solitary, many-seeded, opening.

Genera.—*Caltha*, *Trollius*, *Helleborus*, *Eranthis*, *Aquilegia*, *Delphinium*, *Aconitum*.

SYNOPSIS OF THE GENERA.

Caltha. Leaves simple, crenulate, or dentate. Perianth single.

Trollius. Sepals coloured, indefinite, deciduous. Petals linear (abortive stamens?).

Helleborus. Sepals herbaceous, persistent. Petals tubular.

Eranthis. Sepals deciduous, five-eight. Petals tubular. Fruit stalked.

Aquilegia. Petals funnel-shaped, all spurred at the base.

Delphinium. Sepals five; upper one with a spur.

Aconitum. Sepals five; upper one with a hood.

VIII. *Caltha*, Linn. Marsh Marigold. Semi-aquatic, smooth plants. Stems procumbent, hollow, jointed, with scarious, short sheaths. Leaves simple, undivided, crenate. Sepals five-seven, coloured. Corolla absent. Carpels five-twelve, free, spreading, opening at the upper edge. Seeds numerous, on the margins of the follicle.

1. ***C. palustris*, Linn.** Common Marsh Marigold. E. B. 506, L. C. 26. Root short, vertical, with thick fibres. Stem procumbent, or partly erect, thick, leafy, many-flowered, branching above. Leaves roundish, reniform, thick, smooth, shining; the root-leaves on long petioles, the stem-leaves on short stalks, the upper ones sessile, or nearly so. Flowers large, bright yellow. Carpels nerved, terminating in a beak (the prolongation of the dorsal nerve). In marshy places and moist meadows. Perennial. April.

A. 18, C. 82. Lat. 50°—61°. Alt. 0—1150 yards. T. 51°—36°.

Var. β . Much smaller and more reclining; leaves with the lobes considerably elongated. (*C. ficarioides*?) In mountainous situations.

2. ***C. radicans*, Forst.** Creeping Marsh Marigold. E. B. 2175, L. C. 26 b. Stem reclining, rooting. Leaves triangular-cordate, sharply crenate. Petals obovate. Carpels seven-eight. Scotland. Perennial. May, June.

A variety with double flowers is sometimes cultivated.

IX. *Trollius*, Linn. Globe-flower. Stems erect, smooth. Leaves deeply parted, smooth and shining. Flowers globular. Sepals numerous, the outer ones slightly herbaceous and toothed, roundish, concave, converging. Petals linear, *flattened, incurved*. Fruit (carpels) cylindrical, pointed, in a round head. Seeds ovate, smooth, several in each carpel.

***T. europæus*, Linn.** Mountain Globe-flower. E. B. 28, L. C. 27. Root fibrous. Stems round, hollow, leafy, one-two feet high. Leaves deeply five-parted, the two lateral and lower divisions cleft below the middle, the three upper deeply cleft, lobes deeply incised, with pointed teeth; lower leaves petioled, upper sessile. Flowers bright yellow. Seeds black, shining. Moist mountainous situations in the North of England, Wales, and Scotland. Perennial. May, June.

A. 14, C. 50. Lat. 52°—61°. Alt. 0—1050 yards. T. 47°—37°.

X. *Helleborus*, Linn. Hellebore. Perennial, rigid, herbaceous plants. Leaves coriaceous, pedate, digitate or ternate. Stem,

if present, leafy, branched. Flowers terminal, solitary or aggregate. Sepals five, persistent. Petals eight-ten, small, tubular, deciduous, two-lipped and clawed. Stamens indefinite. Follicles ovate, compressed, coriaceous, keeled, beaked by the styles, opening at the rounded inner margin. Seeds several, attached in two rows to a linear placenta (fungoso umbilico.)

1. **H. viridis**, Linn. Green Hellebore. E. B. 200, L. C. 29. Roots black, oblique. Stem erect, branching slightly above, *annual*. Root-leaves stalked, digitate; stem-leaves sessile, all more or less leathery and rigid, oblong-lanceolate, toothed, especially above, the lower ones sometimes incised. Flowers two-five, slightly drooping. Sepals slightly concave, spreading, green. Carpels oblong, with an elongated beak (the prolongation of the dorsal nerve). Woods in the South of England; on a chalky soil. In a copse near the Fox, Ranmer Common, Denbies, near Dorking.—A. I. Perennial. April, May.

A. 7, C. 20. Lat. 50°—55°. Alt. 0—200 yards. T. 51°—47°.

2. **H. foetidus**, Linn. Stinking Hellebore. E. B. 613, L. C. 30. Stems erect, *persistent*, round, stout, marked with the scars of the deciduous leaves. Root-leaves on long, triangular, channelled foot-stalks, pedate. Leaflets lanceolate, sharply and deeply serrated; the upper leaves gradually becoming simpler till near the summit, where they are lanceolate entire bracts. Flowers numerous, *pendulous*. Carpels on a short stout column. High Laver, Essex. Rockingham Forest, Northamptonshire. Hills above Boxley, near Maidstone, in great plenty.—W. P. and A. I. Perennial. March.

A. 8, C. 20. Lat. 50°—54°. Alt. 0—200 yards. T. 51°—47°. *Wood of Quarry hill den near North*

XI. **Eranthis**, Salisb. Winter Aconite. Perennial, early flowering plants, with radical, much divided, long-stalked leaves. Flowers solitary, on radical scapes. Sepals five-eight, coloured, subtended by an involucre of two leaves. Petals five-eight, very short, tubular, unequally two-lipped. Stamens indefinite. Follicles five-six, somewhat membranous, stipitate, on a common foot-stalk. Seeds round, in one row.

E. hyemalis, Salisb. Winter Aconite. Rchb. 4714, L. C. 28. Roots tuberous. Stalks round, tapering, quite smooth. Leaves rounded in outline, three-five-seven-parted, on cylindrical, tapering, erect leaf-stalks, all radical, divisions cuneate, ultimate segments linear, pointed, quite smooth and shining. Flowers bright yellow, solitary, subtended by a leaf-like, contiguous involucre. Sepals ob-cuneate, rather greenish at the base. Petals tubular, with a claw, two-lipped. Ovaries several, on short stalks. Hemswell, near Spital, Lincolnshire.—A. I. Perennial. February—April.

XII. **Aquilegia**, Linn. Columbine. Perennial plants, with rigid, upright stems, ternate or biternate leaves; leaflets lobed and incised. Flowers terminal, pendulous, solitary or in a lax panicle. Sepals five, deciduous, coloured. Petals five, tubular, terminating

below in a horn-like spur, dilated upwards, oblique at the mouth. Stamens indefinite; pistils five. Carpels as many as the pistils, cylindrical, connivent, parallel, opening below. Seeds numerous, keeled.

A. vulgaris, Linn. Common Columbine. E. B. 297, L. C. 31. Root thick. Stems solitary or few, erect, branching above. Root-leaves on long petioles, biternate; primary divisions ternate on longish stalks, leaflets wedge-shaped or rounded at the base, incised above with very obtuse lobes; stem-leaves sessile, or the lower one with a very short common petiole; floral leaves three-parted with entire divisions. Flowers large; sepals erect, pubescent. Spurs incurved, or nearly coiled. Carpels pubescent-glandular, oblong, with a slender beak. Woods. Perennial. May. *Wood Burnhambull*

A. 13, C. 35. Lat. 50° — 54° . Alt. 0—200 yards. T. 51° — 47° .

XIII. Delphinium, Linn. Larkspur. Bushy, annual, or perennial plants. Stems erect. Leaves much and finely divided. Sepals five, coloured, deciduous, unequal, the upper one extended into a long, hollow, blunt spur. Petals four, free or united, the upper two spurred and included in the spurred sepal. Stamens indefinite, pistils three, rarely one-five. Follicles as many as the pistils, nearly cylindrical, opening at the inner side, crowned with the permanent style. Seeds angular, in two rows.

D. Consolida, Linn. Common Larkspur. E. B. 1839, L. C. 32. Stems erect, branching, downy or hairy. Lower leaves petioled; upper nearly sessile. Flowers bracteate, in short clusters, usually blue, rarely white, sometimes pink. Sepals downy, coloured, with green dorsal nerves; one with a very long conical spur. Petals united, forming a one-lipped, monopetalous corolla, with a cleft upper lobe, and two roundish lateral ones. Fruit often solitary, smooth or nearly so, terminating in a slender beak. Fields, among corn or after harvest, Cambridgeshire; Weybridge, Surrey, by the river. Annual. August.

A. 1, C. 4. Lat. 51° — 53° . Alt. 0—50 yards. T. 49° — 48° .

XIV. Aconitum, Linn. Wolf's-bane, Monk's-hood. Perennial herbaceous plants. Stems erect. Leaves digitate and cut. Flowers in terminal, bracteated clusters. Sepals five, coloured, unequal, the upper one hooded (galeate), two lateral rounded, two lowermost oblong, deflexed. Petals two-five, two upper on long stalks, and concealed in the hooded sepal. Stamens indefinite; pistils three-four-five. Follicles as many as the pistils, ovate-oblong, opening at the inner side. Seeds numerous, angular.

A. Napellus, Linn. Common Monk's-hood. E. B. 2730, L. C. 33. Root fleshy, turbinated, producing short, fleshy rhizomes, which end in tapering roots. Stems erect, simple or branched above, glabrous, or very slightly downy. Leaves glistening, deeply-parted divisions wedge-shaped, two-three-parted, lobes oblong, incised; the lower leaves on long, the upper on shorter petioles. Flowers in ter-

minal, elongated, spicate clusters; peduncles erect, with two small bracts. Sepals downy, blue, the upper one arched, terminating in a beak, the two lower much smaller than the two lateral ones. Two upper petals with a long curved claw, inflexed at the margins, and a curved hollow process (cornea) at the end; the lower petals linear-filiform (abortive stamens). Carpels glabrous, oblong, diverging when young. West of England, near Ludlow. Perennial. June.

A. 4, C. 6. Lat. 52°—54°. Alt. 0—200 yards. T. 49°—47°.

TRIBE IV.—**Pæoniæ**. Leaves alternate or radical. Petals four-five, rarely more, uniform. Carpels two-five, or solitary, many-seeded opening, or fleshy (baccate), not opening.

Genera.—*Pæonia*, *Actæa*.

SYNOPSIS OF THE GENERA.

Pæonia. Fruit capsular (follicle).

Actæa. Fruit a berry.

XV. **Pæonia**, Linn. Piony. Herbs or shrubs, with upright, round stems, and biternate leaves, entire or cut leaflets. Sepals five, persistent. Petals five or more, concave, spreading, with claws. Follicles two-four-five, coriaceous, spreading, on a fleshy disk, opening inwards, crowned with the oblong, recurved stigmas. Seeds numerous, polished.

P. corallina, Retz. Entire-leaved Piony. E. B. 1513, L. C. 34 (Excluded Species, 5th ed.) Root knobby, fleshy. Stems simple, round, leafy, polished, about two feet high. Leaves biternate, with elliptical leaflets; leaflets ovate, entire. Flowers large, crimson, with yellow anthers. Carpels two-four. Seeds black, shining. Steep Holmes, Severn. Perennial. May, June.

A. 1, C. 1. Lat. 51°.

XVI. **Actæa**, Linn. Bane-berry. Perennial herbs, inhabiting cold countries. Stem upright. Leaves bi- or triternate, lobed and cut. Flowers white, in terminal racemes. Sepals four-five, coloured, deciduous. Petals four, alternate, clawed, deciduous. Stamens indefinite, outer sterile (?). Ovary simple, with sessile depressed stigma. Fruit monocarpous, one-celled, indehiscent, succulent. Seeds numerous, in two rows.

A. spicata, Linn. Spiked Bane-berry. E. B. 918, L. C. 35, 5th ed. 34. Stem erect, branched, smooth, two-three feet high, leafy. Leaves bipinnate or biternate; leaflets incised, ovate, quite smooth. Flowers in simple, terminal, elongating clusters. Petals pure white, elliptic, small. Limestone pavement, Ingleborough Hill, Yorkshire. Perennial. June. Fruit, September.

A. 2, C. 2. Lat. 53°—55°. Alt. 0—400 yards. T. 47° (?).

APPENDIX.

ADDENDA ET CORRIGENDA.

Page 2, line 19 from bottom, *instead of* for read *or*. *Submerged* sometimes occurs for *submersed*, as in p. 4. Item, *Phragmitis* for *Phragmites*, *ochreate* for *ocreate*, *Cymballaria* for *Cymbalaria*.

P. 47, *O. majus* and *O. minus* should be *O. major* and *O. minor*, respectively; also, the former, being a synonyme of *O. rapum*, should be bracketed.

P. 50, l. 8-9, for *versicular* read *versicolor*.

P. 53, l. 29, for *Crassalaceæ* read *Crassulaceæ*.

P. 73, last line but three, for *umbilele* read *umbellule*, or *umbellet*. The letter *i*, in termination of some names, as *Lychnites*, is put for *e*.

P. 76, for *Caroyphyllaceæ* read *Caryophyllaceæ*.

Pp. 77, 78, for *Cochlearea* read *Cochlearia*.

P. 78, for *Holoschænus* read *Holoschænus*. Item, for *Geranium* read *Erodium*. Item, for *Matthiolus* read *Matthiola*. Also, in last line, cancel *as*, and change the comma into a semicolon.

P. 78, in last line but two, after *Poa*, for *as* read *also*.

P. 79, for *Scabions* read *scabious*.

P. 79, cancel the comma between *Scabiosa* *Columbaria* and *Asperula Cynanchica*.

P. 80, l. 11, for *Millium* read *Milium*; and in same page, for *Cyparaceæ* read *Cyperaceæ*; and for *Iris foetida* read *I. foetidissima*.

P. 82. *C. pulcaris* is found on dry heaths in Scotland.—*Teste*, William Sutherland, in a letter to editor.

P. 83, cancel comma between *Linaria* and *Elatine*, and read *L. Elatine*.

P. 86, for *H. virides* read *H. viridis*.

P. 89, for *Spartina alternifolia* read *S. alterniflora*.

P. 90, for *Athamaticum* read *Athamanticum*.

P. 134, for *Datylis* read *Dactylis*.

P. 113, l. 8, for *is* read *are*.

P. 136, cancel 1st Sub-division. For *Corallarrhiza* read *Corallo-rhiza*.

Pp. 172 and 173, *E. Muckaii*, *E. variegatum*, with its var. *E. Wilsoni*, grow on the Dœ, Aberdeenshire. (See "Phytologist," vol. i.,

pp. 369, 376, and Wm. Sutherland, in "Phytologist," N. S., vol. ii. p. 337.)

P. 178. *Lastrea dilatata*, var. *dumetorum*, common in Aberdeenshire.—W. S. The passage in text does not mean that this variety is confined to Yorkshire, but only that it abounds there. Its area is probably co-extensive with the typical form of *L. dilatata*.

P. 180, after var. β . *lobatum* enter E. B. 1563.

P. 181, after var. δ . *angustata* enter E. B. 2790.

P. 181, *cancel* fishing town of Finnan, and *insert* on rocks below the fishing village of Cove, first station south of Aberdeen.—*Fide* W. S.

P. 182, *Woodsia hyperborea*, for E. B. 2033 read 2023.

P. 183, to E. F. iv., 283, add E. B. 2199.

P. 186, *Scolopendrium officinale* should be *S. vulgare*.

P. 190, after *Botrychium Lunaria* enter—A. 18, C. 75. Lat. 50°—61°. Alt. 0—900 yards. T. 50°—38°.

P. 191, l. 18, for *Accorus* read *Acorus*.

P. 195. The Battersea forms of *Setaria* have been compared with specimens in the Linnæan Society's herbarium, and also with those preserved in the Banksian, British Museum; and both *S. glauca* and *S. italica* are doubtful. The varieties of *S. viridis* are very remarkable. *S. glauca* and *S. verticillata* are probably among the forms collected there. I will not now indorse *S. italica* as a Battersea plant.—A. I.

P. 200, after *A. fulvus* enter E. B. 1467. The examples of *Crypsis* from Battersea have been compared with herbarium specimens, and are certainly *C. schænoides*. Another species, without the flowers or fruit, is probably *C. alopecuroides*, or *C. aculeata*.

P. 209, for *Milieæ* and *Millium* read *Milieæ* and *Milium*.

P. 210, for *Sessleria* read *Sesleria*.

P. 216. *Aira alpina* is almost exclusively viviparous on the mountains of Aberdeenshire.—W. S.

P. 244, l. 10, for Hislington read Heslington.

P. 249, *C. rariflora*, after mountains of Clova add and of Aberdeenshire.—W. S.

P. 253, after sea-coast add and occasionally in the interior as at Roscobie Den.

P. 256, *C. filiformis*, after rare add Loch Kinnord, Cromar, Aberdeenshire.—W. S.

Pp. 256 and 257, *C. saxatilis*, after Ben Lawers, Scotland, add Glen Callater.—Dickie. Also, for *Grahmi* read *Grahami*.

P. 268, *Juncus balticus*, after sea-shore add in Aberdeenshire, only in the Loch of Drum, twelve miles inland.—W. S.

P. 270, *Juncus castaneus*. The author is reminded by a friendly hand that *rare* should be inserted after the description of this plant. It has been stated, in general terms, that when the provincial and comital estimates are low the plant is scarce, and *vice versa*. There are some exceptions to this assumed rule, but this is not one. Even where it does occur it appears very sparingly.

P. 275, l. 6 from bottom, for radical read radicle.

P. 283, add to note on term *Potamogeton*—"Potamogeton adversatur et crocodilis itaque secum habent eam qui venantur. Castor hanc aliter noverat," &c.—N. H., lib. xxvi., c. 33.

P. 302, for *scordoprasum* read *scorodoprasum*.

P. 306, for *Soolmon's sea*, read *Solomon's sea*.

P. 313, under *Epipogium*, for *E. appyllum* read *E. aphyllum*.

P. 322, under *Listera cordata*, after *turfy*, *mountainous moors*, add *often in woods in Scotland*.

P. 335. "Without ranking *Juniperus nana* as a species, I really think it ought to have a place in your work as a *variety*. Its *habit* is quite different; so compact and dense is it as to present a striking resemblance to the old-fashioned Dutch cut yew-trees, while it never rises more than a foot or so from the ground. Alpine situations."—W. S.

P. 349, under *S. lanata* the localities should be as follow:—Glen Dole, Clova, and Glen Callater, Braemar.

P. 387, under *C. opulifolium* add—"This plant also occurs occasionally at Middlesboro', Yorkshire.—Fide J. G. Baker. This corroborates what is said in the text about the assumed nativity of *C. glaucum*. In Sup. "Yorkshire Fl.," *C. olidum* is published as doubtfully native there, and *C. glaucum* as native *sine dubio*. I have seen a score of localities of *C. olidum* to one of *C. glaucum*, and hundreds of examples of the former to one of the latter.—A. I.

P. 395, under *C. autumnalis*, after *Loch of Drum* and authority *insert Loch Kinnord, Cromar*.—W. S.

P. 463, *H. niger*, add—"A variety from Wandsworth steam-boat pier has a very rigid, round, not very hairy stem. Leaves entire or toothed, ovate. The chief difference between this and the above is in the calyx, which has a more rigid prickly limb, and the teeth are much shorter.

P. 423. The following characters of the two forms of *Thymus* are believed to be more distinctive than those on p. 423:—

T. Serpyllum, Linn. (?). Stems prostrate or ascending, woody at the base, hairy or puberulent, much branched, leafy. Leaves oblong or ovate-oblong, attenuated at the base, pitted (serobiculate) on both sides, nearly smooth. Flowers whorled, in dense terminal clusters. Calyx hairy, with ciliate teeth (the upper lip has three lanceolate, spreading teeth, the lower lip two subulate, erect, ciliate teeth), closed when in fruit with a web-like process of white hairs. Upper lip of the corolla erect, notched, hairy; lower lip spreading. Style nearly as long as the limb of the corolla. Carpels roundish, flattened.

T. Chamædrys, Fr. Barren stems herbaceous, filiform prostrate, reddish, puberulent, leafy. Flowering stems woody, filiform, much branched. Leaves elliptical, or oblong-elliptical, tapering, and ciliate at the base, serobiculate, and with prominent ribs. Flowers in denser and shorter heads than those of the former state. This flowers a month at least before the other variety.

P. 470. Addendum to note on *L. maritimum*:—"With the plants growing at the mouth of the Don and at Muchals your observation

holds good, but not so in reference to those on the shingly shores of the bay of Nigg, Kincardineshire, where it grows in large patches, and really presents a most lovely appearance."

P. 494, *Vaccinium Vit. Id.* I see Mr. Barton very properly notices a peculiarity of this plant, of which I have been cognizant for several years. *It is the case* that both this plant and *A. Uva-ursi* flower in May, June, and again in August, September, and even later; the flowers of the later flowering are often more vigorous and abundant in some places than the *earlier* ones, but of course never arrive at maturity. In my later autumnal rambles I am so constantly finding both these species in flower as to have thought nothing of it until Mr. B. pointed it out as something not generally known, and expressed his desire of further corroboration of his statement, which I now am happy to accord.

P. 497, *C. Trachelium*, add—A. 8, C. 30. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—48°.

P. 497, *C. rapunculoides*, for L. C. 680 read 679, and add—A. 5, C. 6. Lat. 51°—57°. Alt. 0—200 yards. T. 48°—46°.

P. 498, *C. latifolium*, add—A. 14, C. 50. Lat. 51°—58°. Alt. 0—250 yards. T. 49°—44°.

P. 498, *C. rotundifolium*, add—A. 18, C. 81. Lat. 50°—61°. Alt. 0—1150 yards. T. 52°—35°.

P. 498, *C. glomerata*, add—A. 12, C. 40. Lat. 50°—57°. Alt. 0—200 yards. T. 51°—48°. The habitat of the above should be chalk and limestone soils, but not exclusively confined to these, as Walton-on-Thames is one of its localities. In the south of England it is rarely seen but on chalk, and there it is plentiful.

P. 498, *W. hederacea*, add—A. 10, C. 30. Lat. 56°. Alt. 0—300 yards. T. 52°—46°.

P. 498, *S. hybrida*, add—A. 8 (10), C. 30. Lat. 50°—55° (57°). Alt. 0—200 yards. T. 52°—48°.

P. 499, *P. orbiculare*, add—A. 2, C. 5. Lat. 50°—52°. Alt. 0—100 yards. T. 50°—49°.

P. 499, *P. spicata*, add—A. 1, C. 1. Lat. 51°. Alt. 50—100 yards. T. 50°—49°.

P. 499, *J. montana*, add—A. 16, C. 60. Lat. 50°—61°. Alt. 0—350 yards. T. 52°—45°.

P. 500, *L. Dortmanna*, add—A. 9, C. 25. Lat. 51°—59°. Alt. 100—550 yards. T. 48°—41°.

P. 501, *L. urens*, add—A. 1, C. 1. Lat. 50°—51°.

P. 506, *C. tuberosus*, for Melancholy Thistle read Tuberous Thistle.

P. 506, after *C. heterophyllus* enter *C. pycnocephalus*, Linn., a plant of the south of Europe, has been seen at Middlesboro', mouth of the Tees. In this locality *Galactites tomentosa*, Moench, *Centaurea Galatites*, Linn., was also observed.

P. 511, *C. calcitrapoides*, Linn. Relb. Fl. Germ. xv. 798. Stem rigid, glabrous, much branched, round, and wiry. Leaves pinnatifid, with oblong-lanceolate, toothed lobes, sessile and amplexicaule. Heads ovate-globular, solitary, lateral, and nearly sessile. Scales

scarious at the margin, nearly entire, quite smooth, whitish green, terminating in very long stout spines, which have two minute spines on each side of the base. Flowers bright yellow, about as large as those of *C. solstitialis*.

Var. Leaves oblong, linear, slightly toothed. Heads globular, peduncled, with indurated scales, which are crowned by a single stout, long spine, with a membranous-scarious web at their base. Flowers yellow, much slenderer than the type, with more entire leaves.

There are, from Wandsworth steam-boat pier, also the following:—

C. iberica, Trev. Rchb. Fl. Germ. xv. 798. Stems very much branched, slender, striated, slightly furrowed, hairy, leafy. Leaves oblong, elongate, (almost) linear, nearly entire, and sessile, terminating in a short stout spine. Heads on long peduncles, globular, green. Scales armed with palmate spines, the central one slender, straight; the lateral ones rather erect, very small. Ray-florets pale pink.

C. aspera (?), Linn. Rchb. Fl. Germ. xv. 799. Stems very slender, grooved, much branched. Leaves linear, toothed (only slightly), ending in a very feeble point. Heads ovate-cylindrical, elongate, with pale yellowish-green scales, which terminate in very minute, simple, or palmate spines. Flowers pink. Wandsworth steam-boat pier, with the above-mentioned exotics.

C. paniculata, Linn. Rchb. Fl. Germ. xv. 790. Stem erect, straight, with spreading, paniced, straight branches. Lower leaves bipinnatifid; upper pinnatifid, with linear segments. Involucres ovate, with closely appressed membranous bracts (scales); bracts ciliated at the apex, with diverging spinous teeth. Flowers purple. Rare. St. Ouen's Bay, Jersey. Annual. July, August.

I am indebted to Mr. George Wolsey, of St. Andrew's, Guernsey, for this information, accompanied with a specimen.—A. I. The plant was discovered by Mr. Pignet, York Street, Jersey.

P. 513, after *Anthemis tinctoria*, add—A rayless variety of this plant was not uncommon with the type at Wandsworth steam-boat pier.

P. 521, after *G. rectum*, add—*G. sylvaticum*, Sm. E. B. 1139 (913). Roots fibrous. Stems erect, simple, six-eight inches high, covered with loose cottony down. Leaves elongate, linear, tapering at both ends, and pointed, cottony on both sides. Spikes terminal, clustered, leafy. In appearance, as also in the stem and leaves, this form differs widely from *G. rectum*.

Note.—In *G. sylvaticum* the leaves are longer and broader than in *G. rectum*. The plate 1139 of E. B. is a tolerably good representation of *C. sylvaticum*; 124 is a good figure of *G. rectum*.

P. 567. *L. borealis* has almost disappeared at Craibstone, but there are at least twelve other stations in Aberdeenshire. It is a difficult plant to detect, and it is thought that it may exist in every large old wood in this county.—Fide W. S.

P. 583, for *B. sp. No. 1* (?) enter *B. angulosum*, Linn. *Rehb. Ic. Crit.* ix. 816. The plant was determined by a comparison with specimens preserved in the Banksian herbarium.

To an obliging friend I am indebted for the information that the Wandsworth example, described as *Trifolium ochroleucum*, is not that species. It is suggested that it may be *T. albidum*, Retz., a synonyme of *T. panormitanum*, Presl, of which *T. squarrosum*, Auct., is a synonyme; and *T. squar.*, Linn., is synonymous with *T. ochroleucum*. Thus, *T. albidum* = *T. panormit.*; *T. panormit.* = *T. squarrosum*; *T. squar.* = *T. ochroleucum*; all equal to the same thing, and to each other. (*Teste*, Nyman, *Syl. Fl. Europ.*, p. 293.)

On the same authority, some of the Wandsworth specimens of *T. resupinatum* are probably *suaveolens*, and others *T. tomentosum*. Are not *T. resupinatum*, *T. tomentosum*, and *T. suaveolens* synonymes, or, at most, names of varieties?

P. 677, after *Vicia Cracca* enter—*V. pseudocracca*, Bert. A south of Europe plant, occurring at Middlesboro', Yorkshire.

The following Wandsworth Crucifers were determined too late to appear in their proper place:—

P. 695, *Arabis arenosa*, Scop. Stems slender, flexuous, erect or spreading; leaves lyrate-pinnatifid; root-leaves in a rosette; calyx gibbous at the base; pods spreading, compressed; seeds slightly winged at the summit. Annual. July.

P. 701, *Sisymbrium orientale* is *S. Columnæ*, Jacq., according to Grenier, *Fl. Fr.* 94. *S. acutangulum*, described by Grenier as a var. of *S. austriacum*, has short, either smooth or hairy pods, which converge towards the axis.

P. 703, after *S. alba* and var. add *Sinapis hispida*, Schusb., so named by a gentleman well acquainted with Continental botany, by whom the Wandsworth plants were examined and compared with foreign specimens.

P. 706, after *Diplotaxis eruroides* enter *Erucastrum obtusangulum*, Reich. *Diplotaxis bracteata*, Gren. Stems erect or ascending; flowers yellow; sepals spreading; petals yellow, with long claws, pods spreading, with a one-seeded beak. Annual. July.

P. 717, after *Rapistrum rugosum* add *R. perenne*, All. *Rehb. Fl. Ger.* ii. 2.

P. 728, after *Reseda suffruticulosa* enter *R. Phyteuma*, which has entire oblong-obovate root-leaves; stem-leaves trifid, with oblong lobes; flowers large, few. Middlesboro'.

P. 763, after *Silene catholica* insert *Silene nutans* has rather broader and more ciliate leaves than *S. italica*. The latter has a rather longer calyx than the former. *Silene catholica* differs much from both the above. The leaves are broader and shorter, and the flowers are small and greenish; the ovary globular or obovate.

P. 767. *Spergularia rupestris* of the London Catalogue is not that of Cambessedes but of Labillardiere, on the authority of the learned Curator of the Botanical Society of London, who calls it a glandulcus var. of *S. media*. It is not *S. rupestris*, Cambess., which has numerous

and rather erect stems, linear subulate leaves, nearly an inch long, stipules clasping, with few, semi-erect flowers, on short pedicels. Ovary oblong, shortly stipitate. Grows in the fissures of rocks in Brazil. Perennial (?) in its native country. We have still to learn on whose authority it is entered in the 5th edition of the "London Catalogue," as *S. rupestris* of any botanist. It will readily be admitted that it is not *S. rupestris* of Cambessedes, and it differs still more from *Arenaria rupestris* of Labillardiere. This latter is one of the exstipulate species of the group. The Jersey plant is what it is named above; viz., a variety of *S. media*, which is itself probably a variety of *S. marina*, which some botanists believe to be only a variety of *S. rubra*. Thanks to the kindness of the gentleman who favoured me with a specimen as well as with the name of it, I am able to satisfy myself that the history of the discovery of this new Jersey plant is as veritable and instructive as the story of the three black crows.—A. I.

P. 726. After description of *Chelidonium majus* and var. β . *laciniatum* add—A variety, with double or semi-double flowers, but producing perfect seeds, was collected between the village of Auchtergaven and Scone, Perthshire.

Tetterwort, on Halliwell's authority, is Great Celandine, or the plant Celidony, synonymes of *Chelidonium majus*. This name *Tetterwort* had become obsolete in Ray's days, for he gives "the Greater Celandine," in his "Cat. Plant. Angliæ," as the English name of *Chelidonium majus*, and states—"3, Succus herbæ illius, Herpetem miliarem efficaciter compescit et sanat.—D. Hulse." This quality corroborates Halliwell's statement that *Tetterwort* is this plant.

The Swallow-wort is believed by some botanists to be but a doubtful native of these islands. Its name, however, appears in all the ancient glossaries of middle and northern Europe, from the tenth century. The appearance of its name in the old-, middle-, modern-German and Scandinavian languages, is some evidence that the plant existed where it had a linguistic representative.

"RUTHENUS' GARLAND.

(From the Greek Anthology, "Blackwood's Magazine.")

"I send to thee, my Rhodocle, a diadem of flowers,
Wreathed by myself in sunshine among the vernal showers.
The Lily white, with the red Rose, both matchless, gently vies,
Narcissus on Anemone looks down with dewy eyes,
And rich upon the blended bloom the purple Violet lies.
Now Nature looks more beautiful where'er thy footsteps turn:
Flower of the world and queen! I hail thy coronation morn."

"I send to thee, my Rhodocle, with many a living gem,
From spring beds by thy lover culled, a dewy diadem.
The Lily in her simple stole is breathing of delight,
And placed beside the queen of flowers appears more purely white;
Ne'er smiled the Anemone so sweet, now by Narcissus set,
The beauty of them both eclipsed by dark-blue Violet.

"Then proudly place the blended bloom above thy haughty brow,
And to the sun, and skies, and clouds, a fairer Flora show.
Ah, dazzling vision! in my trance, how could I proudly say
The brightest births of nature still the soonest feel decay."

ΜΕΛΕΑΓΡΟΥ.

“ Πλέξω λευκόϊον, πλέξω δ’ ἀπαλοῖς ἀμα μυρτοῖς,
 Νάρκισσον, πλέξω καὶ τὰ γελώντα κρίνα:
 Πλέξω καὶ κρόκον ἥδυν ἐπιπλέξω δ’ ὑάκινθον
 Πορφυρεὴν, πλέξω καὶ φιλεράστα ῥοδὴν
 Ὡς ἀν ἐπὶ κροταφοῖς μυροβοστρυχὸν Ἡλιοδώρας
 Εὐπλοκαμὸν χαιτὴν ἀνθοβολῇ στεφανός.”

“ I’ll wreath the white violets—with the myrtle shade
 Bind soft narcissus—and amidst them braid
 The laughing lily, with whose virgin hue
 Shall blend bright crocus and the hyacinth blue:
 There many a rose shall, interwoven, shed
 Its blushing grace on Heliodora’s head,
 And add fresh fragrance, amorously entwining,
 Her clustered locks with spicy ointments shining.”

MERIVALE.

The ingenious Greeks had no idea of paper hyacinths and buckram roses, the modern ornaments of feminine head-gear. They were all poets. Full of sensitive fancy and imagination, they saw a *touching* charm in the fading garland. They felt that the bright eyes beaming beneath it would grow dim too, and therefore they worshipped them with the more intensely passionate admiration. What would Meleager have said to a lady adorned with artificial flowers, false ringlets, and a painted * * *. *Proh pudor!* He has left no example of such an epigram.

“ The wind-flower and the violet, they perished long ago,
 And the brier-rose and the orchis died amid the summer’s glow;
 But on the hills the golden rod, and the aster in the wood,
 And the yellow sunflower by the brook,
 In autumn beauty stood;
 Till fell the frost from the clear cold heaven as * * *
 And the brightness of their smile was gone from upland glade or glen.”

BRYANT.

“ The lovely flowers of Scotland,
 All others that excel;
 The thistle’s purple bonnet,
 And the bonny heather-bell.
 Oh, they’re the flowers of Scotland
 All others that excel;
 For the thistle in her bonnet blue
 Still nods out ower the fell,
 And dares the proudest foema
 To tread the heather-bell.”

INDEX,

Glossarial and Etymological.

ABBREVIATIONS.—A. S. Anglo-Saxon; C. B. or Cam. Br. Cambro-British; Cel. Celtic; dim. diminutive; Eng. English; fr. from; Fr. French; Ger. German; It. Italian; Lat. Latin; Med. Glos. Mediæval Glossaries; M. Ger. Middle German (Mettel-hoch deutsch); O. Ger. Old German (All-hoch deutsch); q. v. quod vide (look at that); sup. superlative; W. or Westph. Glos. Westphalian Glossary; Dut. Dutch; Dan. Danish.

Many of the ordinal and generic terms, and most of the specific, are significant. The latter express either the time when the plant is in flower, as, *æstivalis*, summer, *hiemalis*, winter, or the place where it grows, a numerous series of names, usually called the *habitats* of the plants, viz., *aquatilis*, *palustris*, *arenosus*, *arvensis*, *sylvaticus*, &c. All of these are explained in detail in the Introduction. The habit of the plant is still more frequently expressed by its trivial name, as, *rectus*, straight or erect; *procumbens*, prostrate; *scandens*, climbing. Special qualities of the plant itself, or its form, colour, size, duration, &c., are most generally denoted by specific names, e.g., *humilis*, low; *procera*, tall; *major*, *minor*, round-leaved, white, perennial, annual. But there is another not unimportant class of names, and perhaps the most ancient, that are not founded upon the same principles as those above stated. They are rarely descriptive, and in these rare cases they are founded on remote relationships and fanciful resemblances, the reasons of which are now only conjectural. The common or popular names, as opposed to the learned, whether they be English, including the German, Danish, Dutch, Scandinavian, and the Teutonic names in general, as also those which have descended to us from the Greeks and Romans, our instructors in science, were originally invented, not to describe or characterize the plants, but rather to express the inventor's opinion of their value. Hence we may account for the frequent occurrence of the term *Lady*, as *Lady's-finger*, or *Our Lady*, or *St. Mary*, or *benedictus*, blessed, &c. In the hagiology of the middle ages the departed saints occupied a prominent place, and the gratitude of the living was exemplified in the dedication of useful and popular plants to their blessed memories. Others, as Robert, Christopher, Bennet, and Henry, might have been the names of pious herborizers of the olden time, who first taught the simple rustics the sanative qualities of certain herbs, which, in memory of their benefactors, were henceforth called by their names. *Barbarea* (Barbara), St. Barnaby, St. John, St. James, and St. Peter became the names of plants which began to flower at or near the days when the festivals of these saints were celebrated. An interesting and instructive article might be prepared on this subject, but this is not the place for it. This is an introduction to an index, which will contain some further remarks both on the popular and scientific nomenclature.

In the names of orders, the vowel *a* of the antepenultimate syllable is long, as, *Linææ*, *Rosææ*, &c.; and the *i* in the antepenultimate of the orders terminating in *feræ* is short, as, *Coniîferæ*, *Cruciîferæ*, but it is accented. The vowel *a* in the penultimate is usually long, as in *inflâta*, *montâna*, *officinâlis*, &c. The vowels *o* and *u* are also, in general, long in the penultimate, as in *nodosa*, *hirsuta*.

In the terminal syllables, *inus*, *ina*, *inum*, the *i* is generally long, except sometimes when it is preceded by a long syllable; *i* in other combinations is usually short, as *aquatilis*, *sylvaticus*. A vowel before two consonants is usually long. Some terms, as *Arbutus*, *Erica*, &c., often mispronounced, have the quantities marked, and the pronunciation determined, for the help of those unskilled in prosodial learning.

APPLE-TREE, Dut. *abeel-boom*, Ger. *albe*, *abele*, and *alber*, the white poplar, 350

Abietinæ, fr. *abies*, 332, 333

Abortion, or an abortive organ, is an imperfect development of said part.

Abrotanum, sæthrenwuda (southernwood), fr. *a*, not, and *ßporos*, mortal; a name given to some plant eminent for its sa-

native virtues. Ger. *aberraute* (boar-rue).

Absinthium, fr. *αψινθιον*, *a*, not, and *ψινθος* = *τρεψις*, a vermifuge, vulg. worm expelling, hence wormwood. An example of a name derived from the real or reputed quality of the plant.

Acanthoides, like an Acanthus, fr. *ακανθος*,

- and εἶδω, I am like to. The affix *oides*, fr. εἶδω, *similis sum*, denotes similarity to the name after which it is placed, as *schœnoides*, like a *Schœnus*, *ranunculoides*, like a *Ranunculus*.
- Acaulis*, *e*, stemless, fr. Lat. *a*, without, and *caulis*, a stalk.
- Acer* and *Aceraceæ*, fr. Cel. *ac*, a point, hence Lat. *acer*, hard or sharp, 738; *A. campestre*, 738; *A. Pseudo-platanus*, 739.
- Aceras*, fr. *a*, not, and *κερας*, a horn, 320; *A. anthropophora*, fr. *ανθρωπος*, and *φορεῖν*, to represent, to bear, in allusion to the form of its flower, 320.
- Acetosa* and *Acetosella*, fr. Lat. *acetum*, an acid.
- Achenium*, small seed-like fruit. (See *Compositæ*, *Rosaceæ*, &c.)
- Achillea*, in honour of Achilles, a Grecian hero, 512; *A. decolorans*, 513; *A. Millefolium*, thousand leaf, 512; *A. Ptarmica*, fr. *πταρμική*, the Greek name of sneezewort, 513; *A. tanacetifolia*, 513; *A. tomentosa*, 513.
- Achlamydeæ*, or *Achlamydeous* plants, fr. *a*, not, and *χλαμυς*, a coat or covering, 70.
- Acicularis*, *e*, pointed, a term derived fr. *acicula*, a small pin or needle, used only in modern Latinity.
- Acinōs*, Gr. name of some plant, like Basil.
- Aconitum*, *ακονη*, cliffy, rocky, because the species grows in rocky places; *ακη*, a sharp point; *A. Napellus*, Lat., a little turnip, fr. *Napus*, 790.
- Acōrus*, said to be derived fr. *a*, privative, without, and *κοριον*, pupil of the eye; it was supposed to be a remedy in diseases of the eye. *A. Calamus*, 279.
- Acotyledonous*, adj., fr. *Acotyledons*.
- Acotyledons*, fr. *a*, not, and *κοτυληδων*, a seed-lobe or leaf, 31, 131, 153.
- Acerogens*, fr. *akpos*, the summit, and *γινεται*, is produced; grows at the apex; increases by additions to the summit, 10, 116, 118, 153, 160.
- Actæa*, fr. *ακτη*, the elder, 791; *A. spicāta*, 791.
- Actinocarpus*, fr. *ακτινη*, a ray, and *καρπος*, fruit; the fruit is radiate, 292; *A. Damasosium*, fr. *damsos*, a corruption of *damascenes*, fr. *Damascus*, 292. An ancient name of some aquatic, described in *Dioscorides*, spelt *Damassosium*.
- Aculeātus*, *a*, *um*, having a sharp point, fr. Lat. *acus*, a needle. In similarly formed words the penultimate is long, as, *perforātus*, *cristātus*, *spicātus*, &c.
- Acuminate*, fr. Lat. *acus*, a needle, tapering and pointed.
- Acutus*, *a*, *um*, fr. Lat. *acus*, a needle; *acutifolius* and *acutiflorus*, acute or sharp, or sharp-leaved, or sharp-flowered, fr. the former, and *folium*, a leaf, and *flos*, a flower. The affix *folius* or *folia*, *folium* or *florus*, *a*, *um*, implies that these organs have the quality denoted by the first portion of the compound term, sharp-leaved, *obtusifolius*, blunt-leaved, &c.
- Adder's-tongue*, *A. S. atter*, fr. *eiter*, poison; Dan. *slange tunge*, 190.
- Adiantum*, fr. *ἀδιαντος*, dry, 187; *A. Capillus Veneris*, hair of Venus, 187.
- Adonis*, a mythic-poetic name, 782; *A. autumnalis*, 783.
- Adoxa*, fr. *ἀδοξα*, humble, 568; *A. moschatellina*, musky, 569.
- Adscendens*, Lat., ascending, climbing, 292.
- Ægilops*, fr. *αἰγίλωψ*, the name of a weed-like grass; *Æ. ovata*, 237.
- Ægopodium*, fr. *αἶξ αἰγος* and *πους*, 184; *Æ. Podagraria*, fr. *πους*, foot, and *æger*, ailing (gout).
- Æstivus*, *a*, *um*, fr. Lat. *æstas*, summer, flowering in summer.
- Æthusa*, fr. *αἶθω*, I burn, an acrid, poisonous plant, 589; *Æ. Cynapium*, fr. *κυνον*, a dog, and *apium*, parsley, 589. This plant in German is named *garten schierling*, because it grows usually in gardens.
- Affinis*, fr. Lat. *ad* and *finis*, near to, alike, related to; a synonyme of *anceps*, *ambiguus*, *confusus*, *dubius*, *obscurus* (?), *multaque alia quæ nunc præscribere longum est*. Sic dicunt Etioniani.
- Agarics*, *Agarici*, *Agaricus*, the name of a very extensive genus of Fungi, fr. *αγαρικον*, and *Αγαρια*, a country of Armenia, 156; *A. phalloides*, 157; *A. muscarius*, fr. *musca*, a fly, fly agaric, 156, 157; *A. campestris*, field agaric; *A. oreades*, fr. *opos*, *mons*, because they grow on open places.
- Agraphis*, fr. *a*, not, and *γραφω*, I write, not written; without the inscribed letters: in allusion to the plant into which Ajax was turned, according to the fable (see Ovid, *Metam.*), which was inscribed with the letters *α*. The above had not this inscription, and hence was called *non scripta*, not written. *A. nutans*, 301.
- Agraria* plants, 82.
- Agrestis*, *e*, fr. *ager*, and *aypos*, a field.
- Agrimonia* and *Agrimoniceæ*, a corruption of *Argemone*, q. v., 644; *A. eupatoria*, 645; *A. odorata*, 645.
- Agrimony*, 644; *Agrimony*, hemp, 529.
- Agrostideæ* and *Agrostis*, fr. *aypos*, a field, because these species grow in open places, and εἶδω, I resemble, 193; *A. alba*, 204; *A. canina*, 204; *A. setacea*, 204; *A. vulgaris*, 204; *A. interrupta*, 205; *A. Spicaventi*, 205.
- Aira*, fr. *αἰπειν*, to hurt, a name given to Darnel, a poisonous grass, 215; *A. alpina*, 216; *A. cæspitosa*, 215; *A. flexuosa*, 216.
- Aizoides*, fr. *αἰζωον*, house-leek, and εἶδω, *similis sum*. The word *aizoon* is supposed to be derived fr. *αἰθαλες*, evergreen; but the derivation fr. *αι*, always, and *ζωη*, life, is more probable, and is nearer to the derived term. The Latin word, *sempervivum*, and English, *everlasting*, also applied to a similar plant, favours this view.
- Ajuga*, *a*, and *ζευγνυμαι*, to unbind, or fr. Lat. *abigo*, to drive away, in allusion to its remedial qualities. *A. alpina*, 435; *A. Chamæpitys*, fr. *χαμαι*, on the ground,

- and *πίτυς*, a pine; its leaves bear some resemblance to pine leaves, 436; *A. pyramidalis*, 436; *A. reptans*, 436
- Ajugoideæ, a tribe of Labiatae, 435
- Alæ, wings, 25
- Alatus, a, um, winged, fr. Lat. *ala*, a wing
- Albūmen, perisperm, what is about the embryo, fr. *albus*, white, 31, 39
- Albus, a, um, adj. white, and *albidus*, whitish.
- Alchemilla, fr. *ar. alkemelyeh*, alchemy, from its imagined potency in the occult sciences.
- A. alpina*, 646; *A. arvensis*, 647; *A. vulgaris*, 646
- Alder, 356, 357; berry-bearing, 665
- Alehoof, ground ivy, *A. S. eorthisig*, 426
- Alexanders, alisanders, a corruption of *Olu-satrum*, black herb, 605
- Alga and Algæ, and Alsal and Algals, fr. *alga*, a water-weed, 115—154
- Alkanet, an Arabic word (?), 465
- Alisanders. (See Alexanders.)
- Alisma and Alismaceæ, fr. Cel. *alis*, water, where the species grow, 291; *A. natans*, 292; *A. Plantago*, 291; *A. ranunculoides*, 292
- Alliaria, W. Glos. *hasen suramphe*, Wood-sorrel, in flower at Easter, when halilujah was sung in the churches, 654
- All-good (King Henry), 387
- Alil-heal, 432
- Alium, fr. Celt. *al*, acrid, hot, pungent, 301; *A. ampeloprasum*, fr. *αμπελος*, a vine, and *πρασον*, a leek; it grew among vines or in vineyards, 303; *A. Babingtonii*, 303; *A. oleraceum*, 302; *A. Schœnoprasum*, fr. *σχοινος*, a rush, and *πρασον*, 302; *A. Scorodoprasum*, *σκοροδον*, a knob; and *πρασον*, 302; *A. sphærocephalum*, fr. *σφαῖρος*, globe, and *κεφαλή*, round-headed, 303; *A. triquetrum*, 303; *A. ursinum*, 301; *A. vineale*, belonging to a vineyard, growing in a vineyard, 82, 302
- Alliaria, fr. *allium*, leek, garlic, because it has a garlic smell
- Alseæ is *Radiola millegrana*, q. v.
- Almond, 617
- Alnus, fr. Cel. *als*, water (Ihre says it is derived fr. *al*, water), Dut. *elze-boom*, 357; *A. glutinosa*, fr. Lat. *gluten*, glue, yielding clammy juice, 357. These Celtic derivations are rather ambiguous, as the following terms, which all signify water, show:—*Alis*, water; *apon*, water; *lis*, water; *siw*, water; *arn*, water, &c.
- Alopecurus, fr. *αλωπηξ*, a fox, and *ουρα*, a tail, 199; *A. agrestis*, 200; *A. alpinus*, 199; *A. bulbosus*, 200; *A. fulvus*, 200; *A. geniculatus*, 200; *A. pratensis*, 199
- Aloides fr. *aloe*, and *ειδω*, like an aloe.
- Alpestris, e, and Alpinus, a, um, fr. *alp*, lofty mountains, like the Alps.
- Alsinastrum, fr. *als*, sea, and *αστρον*, star, or *ar. αλσινη*.
- Alsine and Alsineæ, *αλσινη*, a name applied by Pliny to some *Myosotis*, 766, 769; *A. Cherleri*, in honour of Cherler, a friend of Bauhins, 770; *A. fastigiata*, 770; *A. rubra*, 770; *A. stricta*, 770; *A. tenuifolia*, 769; *A. verna*, 770
- Alternate, arranged on opposite sides, but not growing from the same point.
- Alterniflorus, a, um, and Alternifolius, a, um, alternate-flowered and alternate-leaved, when the flowers and leaves are alternately arranged.
- Alyssum, fr. *a*, not, and *λυσσα*, madness, which it was believed to cure, 707; *A. calycinum*, fr. *calyx*, 707
- Amaranth, 393
- Amaranthaceæ and Amaranthus, fr. *αμαραντος*, unfading, an order and genus of Dicotyledons, 101, 393; *A. Blitum*, fr. *βλιτον*, the Greek name of some culinary plant, 393; *A. retroflexus*, fr. Lat. *retro*, backwards, and *flextus*, bent, 393
- Amarus, a, um, bitter, Heb. *Mara*. "Call me Mara, for the Almighty hath dealt very bitterly with me," Ruth i. 20
- Amarylhidaceæ, fr. *Amarylhis*, a rustic beauty celebrated by Theocritus, 33, 325
- Ambiguus, a, um, uncertain or obscure. A name fitly bestowed on several plants, e. g., *Stachys ambigua*, &c.
- Amentifera, fr. *amentum* (*cachryn*, bearded like barley), fr. *conus*, a cone, and *fero*, I bear. An order, or, in more recent times, a group of orders.
- Amomum, "—ferat et rubus asper amomum," Virg.
- Ammōphyla, fr. *αμμος*, sand, and *φιλεῖν*, to love, 206; *A. arenaria*, 206. These grow in sand.
- Ammineæ and Ammi, grows on sand (?), *αμμος*, 581
- Amphigenis, fr. *αμφι*, prep., round about, in all directions, and *γινεται*, is produced, 116, 117, 118, 131, 132, 153, 154
- Amphibium, a, us, *αμφι*, and *bios*, life, that grows on land and in water.
- Amplexicaulis, e, stem-clasping, fr. *amplexus*, embracing, and *caulis*, stem.
- Amygdalaceæ, fr. *αμυγδαλος*, a, almond, 617
- Amygdaloides and Amygdalina, almond-like.
- Anacharis, fr. *ana*, without, and *χαρις*, grace; *A. Alsinastrum* (*canadensis*), 113
- Anagallis, fr. *αγαλλis*, the name of a plant, called by the Germans *gauch-heil*, fool's-heal; some say it is the cuckoo-flower, which is in bloom when the bird sings his unwelcome note, *maritis cornutis*. *A. arvensis*, 411; *A. cœrulea*, 411; *A. tenella*, 412
- Anastomosing, the union of nerves or veins, fr. *αναστωμοσις*, a combining.
- Anatropal, *ana*, and *τρεπω*, when the apex is at the base, 30
- Anchusa, fr. *αγχουσα*, colour, 465; *A. officinalis*, 465; *A. sempervirens*, 465. The roots of some yield colouring substances.
- Andersoniana, a commemorative name, of which there are many; and it is needless to repeat them, for they declare their own meaning.
- Andrōmēda, a poetic-mythic name, 491; *A. polifolia*, 492

- Androsæmum, fr. *avep*, gen. *ανδρος*, and *αμα*, blood, a name given to another plant, Danewort, because it grew where the Danes were slaughtered. If the name Danewort be genuine, it may be inferred that this plant has been long established among us.
- Anemône, fr. *ανεμος*, wind, both a Greek and an English word; in the original the penult is long, in English it is short, 782; *A. appenina*, 782; *A. nemorosa*, 782; *A. Pulsatilla*, 782; *A. ranunculoides*, 782
- Anemône, or wind-flower, 782
- "The coy anemône that ne'er uncloses
Her leaves until they're blown on by the
wind."
- Angelwort, 594, 595, fr. Lat., excellent or superior.
- Angelica and Angelicæ, fr. Lat. *angelus*, angel, 594; *A. sylvestris*, 595
- Anglicus, a, um, English.
- Angular, is, fr. Lat. *angulus*, an angle.
- Angustifolia, us, um, fr. Lat. *angustus*, narrow, and *folium*, a leaf, and sup. *angustissimus*, a, um, very narrow.
- Animals, 131
- Annotinum, a, us, Lycopod. an, fr. Lat., *anno*, and *tenuis*, that which is of one year old, in allusion to the growth of this plant. The penultimate *i*, in words terminating in *inus*, though usually long, is shortened when the preceding syllable is long, as above. See also *vitellina*, *clandestina*, *secalinus*, &c.
- Annus, a, um, yearly, annual, fr. Lat. *annus*, a year.
- Anserina, fr. Lat. *anser*, a goose, Goose-weed.
- Antennaria, fr. Lat. *antennæ*, insect-feelers, 521; *A. dioica*, 522; *A. margaritacea*, fr. Lat. *margarita*, fr. *μαργαρον*, pearl, in allusion to the pearly colour of some of the species, 522
- Anthemis, fr. *ανθεμον*, a flower, 513; *A. arvensis*, 513; *A. Cotula*, fr. *κοττα*, a head, and *κοτυλη*, 514; *A. maritima* (*A. anglica*), 514; *A. nobilis*, 514; *A. tinctoria*, fr. Lat. *tingo*, I dip, or dye, 514
- Anthericæ, a tribe of Liliaceous plants, fr. *ανθερικος*, the name of the Greek spider-wort, 299
- Antheridia, male organs (?) of Mosses, fr. *ανθηρος*, q. v.
- Anthier, the pollen case, fr. *ανθηρος*, flowering, blooming.
- Anthoceros and Anthoceratæ, fr. *ανθος*, a flower, and *κερας*, a horn; fr. the horn-like fructification, 161
- Anthoxanthum, fr. *ανθος*, flower, and *ξανθος*, yellow, 197; *A. odoratum*, 197
- Anthriscus, fr. *ανθρυσκον*, *ανθος* and *ρυσκος*, I free from, a vulnerary, a plant described by Pliny. *A. Cerefolium*, fr. *χαρω*, I delight in, and *φυλλον*, a leaf; an estimable plant, the same as *chero-phillum* and *chervil*; *carvi* and *carui* and *caraway* are all from the same root, 602; *A. sylvestris*, 602; *A. vulgaris*, 52, 601
- Anthyllis, fr. *ανθος*, a flower, and *ιουλος*, a beard, bearded, 661; *A. vulneraria*, 661
- Antirrhinum, fr. *αντι*, and *ριν*, a snout, 447; *A. majus*, 447; *A. Orontium*, so named from the place where it grew, the river Orontes in Syria.
- Aparine, fr. *απο*, and *ριν*, without a nose, unbeaked.
- Apargia, fr. *απαργια*, fr. *απο*, and *αργια*, inutility, good for something; *A. hispida*, 536
- Apetala, fr. *a*, without, and *πεταλον*, a leaf or petal.
- Aphaca, fr. *αφακη*, fr. *a*, not, and *φαγω*, I eat, not fit to be eaten.
- Apiculate, fr. *απεα*, a point.
- Apifera, us, um, fr. Lat. *apis*, a bee, and *fero*. I bear, in allusion to the singular resemblance the flower bears to a bee.
- Apium, fr. Cel. *apon* or *avon*, water, where these plants grow, 586; *A. graveolens*, 586
- Apocynaceæ, fr. *απο*, and *κυων*, dog's-bane, 484
- Apothecia, the cups or shields containing the fructification of Lichen *απο*, from, and *θηκη*, a case, sheath, &c.
- Apple, Gaelic *abhal*, Ger. *apfel*, 54, 612
- Apple-tree, 108, 614; stone-apple, 614
- Apple-thorn, 463
- Aquatic plants, 75
- Aquaticus, a, um, and *aquatilis*, fr. *aqua*, water, growing in or near or under water.
- Aquifoliaceæ, fr. *acutus* and *folium*, sharp-leaved, 486
- Aquilegia, fr. *aquila*, an eagle, to the claws of which the nectaries bear some resemblance, 789; *A. vulgaris*, 790
- Arabis, fr. Arabs, Arabian, 694; *A. ciliata*, 694; *A. hirsuta*, 694; *A. petræa*, 695; *A. stricta*, 695; *A. turrita*, 695, fr. *turris*, a tower, where the plants grow.
- Araceæ and Arum, fr. *aron*, an Egyptian name, origin unknown. *αρον* (?), fr. *αιρω*, remove, take off, kill, 21, 191
- Arachnites, fr. *αραχνη*, a spider, like a spider.
- Araliaceæ (Lake Aral).
- Aranifera, us, um, fr. Lat. *aranea*, a spider.
- Arborea, us, um, of or belonging to a tree, fr. Lat. *arbor*, a tree.
- Arbuscula, Lat., dim. a little tree.
- Arbutus, fr. *arbor* and *arbutum*, a grove of trees, vulgarly pronounced as if the penult was long—"Dulce, * * * depulsis arbütus hædis," "Stolen waters are sweet," 492; *A. Unedo*, fr. I eat one, say fanciful etymologists, and that is one too many, 492. "Unedones," Pliny.
- Archangel, 427, 595; Archangel, yellow (*Lamium Galeob.*), 429
- Archangelica (superior), 595; *A. officinalis*, 595
- Arctium, fr. *αρκτος*, a bear, hence *dur*, rough as a bear, 507; *A. commune*, 507; *A. Bårdana*, 508
- Arcticus, a, belonging to the north, fr. *αρκτος*, a bear, the north.

Arctostaphylos, fr. *αρκτος*, a bear, and *σταφυλη*, a bunch, 492; *A. alpina*, 493; *A. Uva-ursi* (bear-berry), 492
 Arenaria, fr. Lat. *arena*, sand, where the species grow, 771; *A. ciliata*, 772; *A. norvegica*, 772; *A. serpyllifolia*, thyme-leaved, 771; *A. trinervia*, 771
 Arenarius, a, um, fr. *arena*, sand, Arenosus, a, um, sandy; trivial names of plants, which grow in a sandy soil.
 Arcuatus, a, um, bent, fr. Lat. *arcus*, a bow.
 Argemone, fr. *αργεμα*, because it purged or cleared the eyes.
 Argentea, fr. Lat. *argentum*, silver.
 Aria, fr. *aria*, a name applied by Theophrastus to a laurel-like tree or shrub.
 Aristatus, a, um, fr. *arista*, an awn.
 Aristolochia and Aristolochiaceæ, fr. *αριστος*, excellent, and *λοχη*, birth; hence birthwort, 397; *A. Clematitis*, fr. *κλημα*, and *κλαδος*, a shoot or sprout, hence Clematis and Clematitis, not Clematis, 398
 Armeria (Sweet William), sea-pink, 403; *A. maritima*, 403; *A. plantaginea*, 403
 Armoracia, fr. *Armorica*, 710; *A. rusticana*, 710
 Arnoseris, 532, fr. *arvos*, a lamb, lamb's-lettuce; *A. pusilla*, 532
 Aromaticum, a, us, fr. Lat. *aroma*, aromatic.
 Arrow-head, 289, 293
 Arrhenatherum, fr. *αρρην*, male, and *αθηρ*, an awn, 206; *A. avenaceum*, fr. *avena*, oat-like, 207
 Artemisia, or mater herbarum (Matricaria), fr. *αρτεμης*, Diana, 518; *A. vulgaris*, 518; *A. absinthium*, fr. *αψινθιον*, the same sense as wormwood, vermifuge, 518; *A. campestris*, 518; *A. maritima*, 518
 Arthrolobium, fr. *αρθρος*, a joint, and *λοβος*, a shell or pod, has a jointed pod, 682; *A. ebracteatum*, 682; *A. scorpioides*, 683
 Articulatus, a, um, fr. Lat. *artus*, a joint, jointed.
 Arum, fr. *apov*, 278; *A. italicum*, 279; *A. maculatum*, 6, 279
 Arundinacea, us, um, fr. Lat. *arundo*, like a reed; or fr. Cel. *arn*, water; or fr. *arendo*, fading soon. "Who shall decide when doctors disagree?" Aceæ = οιδες, like or resembling.
 Arvensis, fr. Lat. *arvum*, a field.
 Arve, henbit or chickweed.
 Asarabacca, 398
 Asarabacca, haslewort. Ancient glossary. A word formed, like *abracadabra*, to make the latter half rhyme with the former.
 Asarum, fr. *ασαρων*, foal-foot, or a kind of spikenard, 398; *A. europæum*, 398
 Ash, mountain, 37, 615, 617
 Ash-tree, 50, 485-486, *A. S. esce*.
 Ashweed, goutweed, 584; goat's-foot, 584, 585
 Asparagus, Greek, fr. *σπαρασσω*, I tear, 305; *A. officinalis*, 305
 Asp, or aspen—"Miror helenistas nostros nondum etymon accersivisse, a Gr. *ασπαιρω*, palpito, vibro," Skinner, 351

Asper, era, um, rough.
 Asperugo, fr. *asper*, rough, 472; *A. procumbens*, 473
 Asperula, fr. *asper*, rough, 559; *A. cynanchica*, dog's-bane, 559; *A. odorata*, 559; *A. arvensis*, 560
 Asphodel, bog, 304
 Aspidiæ and Aspidium, fr. *ασπις*, gen. *ασπιδος*, a shield, which the indusium resembles, 176. The British species of this genus are now called Lastrea and Polystichum.
 Asplenæ and Asplenium, fr. *a*, not, and *σπλην*, a preventive of obstructions of the viscera; *A. adiantum-nigrum*, fr. *αδιαντος*, dry, 183; *A. fontanum*, 184; *A. germanicum*, 185; *A. lanceolatum*, 184; *A. marinum*, 184; *A. ruta-muraria*, 185; *A. septentrionale*, 74, 185; *A. trichomanes*, 184; *A. viride*, 185
 Aster, fr. *astrum*, a star, 524; *A. Tripolium*, fr. *τρι*, and *πολιος*, so-called because its flower changed three times in one day, a blue daisy, 524
 Astragalus, fr. *αστραγαλος*, the vertebra, a name applied to a knobby-rooted plant, 673; *A. alpinus*, 674; *A. glycyphyllos*, 673; *A. hypoglottis*, 674
 Astrantia, fr. *astrum*, a star, because its bracts resemble rays, 581; *A. major*, 581
 Athamantum, fr. *αθαμας*, gen. *Αθαμαντος*, a mythic king of Thessaly, Ovid's *Met.*, iv. 11
 Athyrium, fr. *a*, not, and *θυρα*, a door, in allusion to the open or reflexed indusium, 182; *A. Filix-femina*, female fern, 183; *A. fontanum*, fr. *fons*, a fountain, 183, 184; *A. rhaeticum*, 183
 Atratus, a, um, fr. *ater*, black.
 Atriplex, Lat., a name of a culinary plant described by Pliny, 388, 388; *A. angustifolia*, 389; *A. deltoidea*, 390; *A. laciniata*, 390; *A. littoralis*, 388; *A. marina*, 388; *A. patula*, 389; *A. rosea*, 390
 Atropa, fr. *ατροπος*, a, and *τροπω*, I stop the wheel, or cut the thread of life, 462; *A. Belladonna*, named in honour of Our Lady, 462
 Aucuparia, fr. Lat. *auceps*, a fowler, fowler's-tree.
 Aurantiæcus, a, um, fr. *aurum*, gold, having an orange colour.
 Aureus, a, um, golden, fr. *aurum*, gold.
 Aurifcomus, fr. Lat. *aurum* and *coma*, hair, gold hair.
 Auricle, fr. *auris*, an ear, a lobe at the base of a leaf.
 Auriculate, fr. *auris*, an ear, lobed at the base, having two lobes or ears, 14
 Auritus, a, um, eared, fr. Lat. *auris*, an ear.
 Autumnalis, fr. *autumnus*; *æstivalis*, summer; *vernalis*, spring; and *hiemalis*, winter; the qualifying names of the four seasons.
 Avellana, an adjective derived from Avella, a town of Campania, famous for producing filberts, 354. The common nut is "Nux avellana sylvestris," hence it should have a small initial a.

- Aviculäre**, is, fr. Lat. *avis*, a bird, and *colo*, I frequent.
- Avena** and **Avenæ**, 193; Cel. (?) *atun*, oat, and *etan*, 212; *A. alpina*, 214; *A. caryophyllæ*, 215; *A. fatua*, 213; *A. flavescens*, 214; *A. planiculmis*, 214; *A. præcox*, 215; *A. pratensis*, 214; *A. pubescens*, 213; *A. strigosa*, 213
- Avens**, 638
- Axil**, angle; **Axillaris**, axillary, in the angle.
- Axis**, the part around which leaves, flowers, &c., are arranged, 20
- Axiwort**, 716
- Azalea**, fr. *αζαλεος*, dry, 491; *A. procumbens*, 491
- Bachelor's buttons**, fr. Lat. *baccalauri*, hence bachelor. The flowers have a resemblance to the jagged cloth buttons anciently worn. *Flos-cuculi* (see *Gerarde*, *sub voce*).
- Bald-money**, 594
- Ballōta**, fr. *βαλλω*, I throw away, worthless, 433; *B. fœtida*, 433
- Balm**, 425
- Balsam**, 752, 753
- Balsaminaceæ**, from *balsamum*, 752
- Banc-berries**, 791
- Barbaræa**, in honour of St. Barbara, 693. Several plants bear the names of saints, and the most popular is St. Mary, commonly styled in the floral nomenclature, Lady, or Our Lady, or Belladonna, or Mariana. *B. præcox*, 694; *B. stricta*, 694; *B. vulgaris*, 694
- Barbatus**, a, um, bearded, fr. Lat. *barba*, beard.
- Barberry**, 778
- Barbiana**, fr. *bardane*, Fr., and *barde*.
- Barley**, 236, fr. *beer*, because beer is sometimes brewed from malt.
- Barrenwort**, 778, 779
- Bartsia**, *nomen honoris*, to commemorate Linnæus's friend, John Batsch, M.D., 452; *B. alpina*, 453; *B. Odontites*, fr. *οδους*, a tooth, and *ειδω*, I am like, a corruption of *Odontites*, *Pliny*, 452
- Basil** fr. *basilica*, royal (?) ; fr. *βασιλευς*, a king, 425
- Baste** (Linden), inner bark.
- Bastard toadflax**, 396
- Beam**, 54
- Beam-tree**, white, 616
- Beam**, horn, fr. Ger. *beam*, a tree, and *horn*, hard, 354
- Bean**, 657
- Bear-ber**, 492
- Beccabungæ**, fr. Ger. *bachebunge*, fr *bach*, a brook, and *bunge*, a purse or bundle; or fr. A. S. and old Eng. *beck*, and *hung*, a purse. In Yorkshire streamlets are called *becks*, brooks, hence brooklime.
- Buckbean** is a corruption of *beck-bean*, or brook-bean.
- Bear's-foot**, 789
- Bed-straw**, 558, 560, 562, 563
- Beech**, 352
- Beet** 383
- Bellflower**, 496, 498
- Bells**, Lat. *bellus*, beautiful, 517; *B. perennis*, 517
- Belladonna** (*Benedictus*).
- Berberidaceæ** and **Berberis**, fr. Arabic, 778; *B. vulgaris*, 20, 778
- Berberry**, 778
- Beta**, fr. Cel. *bett*, red, 383, 388; *B. maritima*, 388. "Ut sapient fatuæ fabrorum prandia betæ"—Tasteless as dinner of insipid beet.
- Betonica**, fr. *ben*, good, and *ton*; *Βεντιστος* in Doric Gr., is *Βελτιστος* in Attic, Theoc., or, according to some, from Vettones, who first discovered the good qualities of the plant.
- Betony**, wood, 431
- B-tula**, "fortasse sic dicta ab usu," a threshing instrument, to beat, 355—
"Afflictive birch,
Cursed by unlettered idle youth."
B. alba, 355; *B. nana*, fr. *nanus*, a dwarf, 356
- Betulaceæ**, an order of amentiferous trees.
- Bicolor**, fr. *bis*, two, and *color*, colour. In this and similar words, when all the syllables are short, the accent or stress of the voice in pronouncing it is laid on the first syllable, or foot, as a prosodian would say. *Tricolor*, *côncolor*, *versicolor*, and numerous words, are regulated by this law, viz., accent the antepenultimate syllable, or the third from the end. The tendency of our language is to accent as far from the final syllable as possible; hence the radical syllable is often left unaccented, although the most important part of the word.
- Bidens**, fr. Lat. *bis*, two, and *dens*, tooth, *bidentate*. two-toothed, 511; *B. cernua*, 512; *B. tripartita*, 512
- Biennis**, fr. Lat. *bis*, two, and *annus*, a year.
- Bifidus**, fr. Lat. *bis*, two, and *fido*, I cleave, separated half-way into two pieces.
- Biflorus**, a, um, fr. Lat. *bis*, two, and *florus*, flowered.
- Bifolius**, a, um, fr. *bis*, two, and *folium*, a leaf two-leaved; *trifoliatus*, three-leaved; *quadrifoliata*, four-leaved.
- Biglumis**, e, fr. Lat. *bis*, two, and *gluma*, a scale.
- Bilberry**, fr. Dan. *böllbær*, bilberry; Sw. *blibær*; Scot. *blackberry*; the English form is from the Danish *böllbær*, the first syllable of which is = *bil*, 50, 493, 494
- Bindweed**, 475, 476, 477
- Bindweed**, black, 378
- Binervis**, two-nerved; *trinervis*, three-nerved.
- Bipinnate**, twice pinnate.
- Birch**, Scot. and Dan. *birk*; Cel. *bedw*, *bedu*, 355, 356
- Bird-cherry**, 618
- Bird's-foot**, 662, 663, 682
- Bird-lime** (*Mistletoe*), 671
- Bird-grass**.
- Bird-milk**, Ger. *vogel-milk*.
- Bird's-eye** (germander speedwell), 443; *Bird's-eye primrose* 407; *Bird's-nest*,

- 320; Bird's-tongue (*Senecio paludosus*), 529; Bird-tree, 80; Sor. Aucup, 615
- Birthwort, 397, 398
- Bishopwort (*Biscop wurt*), *Betonica*, 431
- Bistort, fr. *bis*, twice, and *tortus*, twisted, 375
- Bitter-sweet, Dan. *bitter-søde*, 461
- Bitter-pilewort, *Hydropiper*.
- Blackberry, 627
- Black nightshade, 50
- Blackthorn, 53
- Bladder-nut, 738
- Bladder-seed, 604
- Bladder-snout, 447
- Bladderwort, 414
- Blattaria, fr. Lat. *blatta*, cockroach.
- Blechnum, *βληκνον*, a Gr. name for some fern; B. Spicant, fr. *spicare*, to form a spike; they form a spike.
- Blewart, Dan. *blawort*, Korn Bloemster, 510—
 "When the blewart bears a pearl,
 And the daisy turns a pea,
 And the bonny lucken gowan
 Has folded up her e'e;
 Then the laverock frae the blue lift,
 Doops down, and thinks nae shame
 To woo his bonny lassie,
 When the kye comes hame."
- Blinks, 53, 655
- Blitum virgatum, 387
- Blite, 393
- Bloodwort (*Rumex sang.*), 380
- Blue-bottle, or Blue-bonnet, 510
- Bogbean, 50; Buckbean, fr. *beck*, brook, and *ean*, which the fruit resembles, 479
- Boletus, fr. *βολος*, a ball, in allusion to the rounded form of many of the species, 157; B. edulis, eatable boletus, fr. *edo*, I eat, 157
- Borage, 101, 463
- Boraginaceæ, fr. *Borago*, 463
- Borago, quasi a cor. et ago, "Borage gives courage," 50, 83, 82, 110, 464; B. officinalis, 465
- Borealis, e, fr. *βορεας*, the north.
- Botany, fr. *βοτανη*, an herb, 1
- Botrychium, fr. *βοτρυς*, a cluster, in allusion to the clustered fructification, 189; B. Lunaria, fr. *luna*, the moon, in allusion to the crescent-shaped leaflets, 190
- Box, 367. This is one among the many examples of plant- that have been named from the uses which they subserve. Box, because boxes were made of it; hence *pix*, a little box.
- Brachypodium, fr. *βραχυς*, short, and *πους*, foot, 232; the pedicels are short in this genus, or the florets are nearly sessile; B. pinnatum, 232; B. sylvaticum, 232
- Bract, the name of floral leaves, or those by which the flowers are subtended.
- Bramble, fr. A. S. *bremel*, 54, 123, 626, 638. *Thornas* and *bremeles*, Gen. iii. 18.
- Brank, Buckwheat. One of the absurd names of modern times, a corruption of the meaning of *Fagopyrus*. beech-wheat, fr. *φηγος*, Dor. *φαγος* and *πυρος*, wheat; Ger. *buche*, a beech; hence our beech, 379
- Brassica, fr. Cel. *bresych*, or *bresic*, a cabbage, fr. which also *βιβρωσκει*, I eat, and Scot. *brose*. Varro derives the name from Lat. *præseco*, because it is cut from the stalk! B. campestris, 702; B. Napus, 702; B. oleracea, 702; B. Rapa, 702
- British species, 97
- Briza, fr. *βριζα*, I balance, 235. The spikelets are suspended as from the ends of a balance. B. media, 225; B. minor, 225
- Bromus, fr. *βρωμα*, food, and *βρω*, I eat, 220; B. arvensis, 231; B. asper, 229; B. commutatus, 231; B. diandrus, 230; B. erectus, 229; B. maximus, 230; B. mollis, 230; B. patulus, 231; B. racemōsus, 231; B. secālinus, fr. *secāle*, rye; B. sterilis, 230
- Brookweed, 51, 410
- Broom, golden, 54
- Broom, rape, 454, 457
- Bryonia, 568; B. dioica, 568
- Bryony, 53, 568
- Buckbean, Dan. *bukke-blade*, fr. Dan. *bæk*, a brook or rivulet, where the species grow, 479
- Buckbean, fringed, 479
- Buckthorn, 55, 358, 684
- Buckthorn plantain, 401
- Buckwheat, fr. Ger. *buche*, a beech, and *πυρος*, wheat, 373, 379. (See Brank.)
- Buffonia, named in honour of the celebrated Buffon, 769; B. tenuifolia, 769
- Bugle, fr. *βους*, ox, *bugail*, a herdsman, Cam Br., 435, 436
- Bulbifera, fr. *bulb*, and *fero*, I bear.
- Bulbocastanum, bulb-chestnut, 585
- Bulbōsus, a, um, bulbous, adj. fr. *bulb*; the penult in such words is long, *ōsus*.
- Bullace, 618
- Bumble-kites, or blackberries, q. v., 627
- Bunium, fr. *βουνος*, a hill or open place, where these plants grow, 588; B. flexuosum, 588
- Bupleurum, fr. *βους*, ox, and *πλευρον*, rib, rib-leaved plants, 582; B. aristatum, fr. *arista*, an awn, 583; B. falcatum, fr. *falz*, a hook, 582; B. protractum, 583; B. rotundifolium, 583; B. tenuissimum, 582
- Burdock, 507
- Bur-marigold, 511, 512
- Burnet, 645, 646
- Burnet saxifrage, 588
- Burnet, salad, 645
- Bursa-pastoris, shepherd's-purse, 715.
- Burweed, 552
- Butomus, fr. *βους*, ox, and *τεμνω*, I cut, 293; B. umbellatus, 293
- Butterbur, 51
- Buttercups, "that will be seen whether we will or no."
- Butterwort, 412, 413
- Buxus, *πυξος*, and Lat. *buxus*, same root as *box*, q. v., 366; B. sempervirens, evergreen, 367
- Cabbage, fr. It. *capuccio*, a cowl or hood,

- hence capuchin or hooded friar, a term applied to cabbage and lettuce, because the leaves resemble this clerical head-cover; *capa*, covering for the head, is from *caput*, the head, 702
- Caducous, from Lat. *cado*, I fall. When the sepals fall off before the corolla expands, they are caducous, as in the poppy; and when the petals fall off before the pollen is shed, they are caducous.
- Cæspitosus, a, um, turfy, fr. *cæspes*, a turf.
- Cakile (Arabic), 717; C. maritima, 717
- Calamagrostis, fr. *calamus*, a reed, and *agrostis*, a grass; C. epigejos, *ἐπι, ὄν*, and *γη*, the earth, not growing in water, 205; C. lanceolata, 205; C. lapponica, 206; C. stricta, 205
- Calamint, 423
- Calamintha, fr. *καλός*, good, and *μινθα*, mint, 423; C. officinalis, 424; C. Nepeta, 424; C. sylvatica, 425; C. Clinopodium, *κλινη*, a bed, and *πους*, a foot, 425
- Calamus, Lat. *a reed*, and *calamaria*, related to a reed, or reed-like
- Calathian violet, 482
- Calf's-nout, Antirrhinum Orontium, 473
- Calciträpa, the Lat. name of an instrument with four spikes. If the penult be long, it is probably from same root as *trap* or *trappen*, and should be Calcitrappa, fr. Lat. *calcitro* (*calcä*, the heel), a name sometimes given to plants or seeds armed with spurs, which are worn on the heel. This is the primary idea conveyed by *calci*; the first half of the compound term, *trapa*, may be from the same root as *trap*, a snare, hence *ertrappen*, A. S. *treppan*, Fr. *attraper*. By analogy the antepenult should be accented by rule under *bicolor*, as *saxifraga*.
- Callitrichacæ and Callitriche, fr. *καλός*, and *τριξ* *τριχος*, beautiful hair, 53, 394; C. autumnalis, 394; C. verna, 394
- Caltha, fr. *καλαθος*, a cup, 788; C. palustris, 788; C. radicans, 788
- Caltrops, frog's-lettuce (Potamogeton), 283
- Calluna, *καλυνω*, I sweep, 490; C. vulgaris, 490
- Calyculatum and Calycinus, a, um, fr. *calyx*. When plants are furnished with a double or secondary calyx, as in *Potentilla*, or when there are several bracts contiguous to the calyx, as in *Crepis*, they are called calyculate.
- Calyx, fr. *καλαθος*, a cup, a little cup, 23
- Cambium, 89.
- Camelina, fr. *χαμαι*, humble, and *λινον*, flax, 710; C. sativa, 710
- Cammock, "A. camb. Br. Camog," Junius, 660, 661
- Campanula, Campanulacæ, and Campanulæ, fr. *campana*, a bell, and *campanula*, a little bell, which the flowers resemble, 33, 495, 496; C. glomerata, 491; C. latifolia, 497; C. patuli, 497; C. persicifolia, 496; C. rapunculoides, 497; C. rapunculus, 496; C. rotundifolia, 498; C. Trachelium, 497
- Campestris, e, fr. Lat. *campus*, a plain, open flat places; plants growing in such are so termed.
- Campion flower, 764, 765
- Campylopermæ, fr. *καμπυλος*, hollow, and *σπερμα*, seed, 599
- Campylotropal, fr. *καμπυλος*, bent, 30, and *τροπω*, curved or bent on itself.
- Canadensis, adj., belo ging to Canada, growing there; and Canariensis, Canaries, so called because the seeds of this grass produce the famous Canary-bird seeds.
- Candy-tuft, 713
- Canescens, fr. *canescere*, to become grey.
- Caninus, a, um, adj., fr. *canis*, a dog, worthless plants (?).
- Cannabineæ and Cannabis, fr. *καννα*, a reed, in allusion to the reed-like stems, 369; C. sativa, 370
- Canum, us, a, hoary. (See Canescens.)
- Capillus, a hair, Capillaris, e, very narrow leaves, &c., are so called.
- Capitatus, a, um, capitate, fr. Lat. *caput*, a head.
- Capreolatus, a, um, and caprea, fr. *capra*, a she-goat.
- Caprifoliacæ, the honey-suckle family, fr. Lat. *caper*, a goat; many of the species are climbers, 564
- Caprifoliæ, 565
- Capsula, Lat. a little coffer, fr. Lat. *capio*, I take, and *capax*, holding, 715; C. Bursa-pastoris, 715
- Caraway, 585
- Curdamine, fr. *καρδια*, the heart, and *δαμαειν*, to strengthen, a cordial, 696; C. amara, 696; C. hirsuta, 696; C. impatiens, 696; C. pratensis, 697; C. sylvatica, 696
- Cardiæcus, a, um, fr. *καρδια*, the heart; cordial.
- Carduus, fr. Cel. *ard*, a point, *αρδ*, Lat. *arduus*, 503; C. acanthoides, 504; C. acaulis, 506; C. arvensis, 505; C. eriphorus, 504; C. Forsteri, 505; C. heterophyllus, 506; C. lanceolatus, 504; C. nutans, 504; C. palustris, 505; C. pratensis, 506; C. tenuiflorus, 504; C. tuberosus, 506
- Carex, *κειρω*, I shear or cut, in allusion to the sharp leaves, 240; C. acuta, 248; C. ampullacea, fr. *ampulla*, a bottle, 256; C. aquatilis, 249; C. arenaria, 242; C. atrata, 247; C. axillaris, 244; C. binervis, 254; C. Bœninghausiana, 244; C. brizoides, 244; C. Buxbaumii, 247; C. cæspitosa, 248; C. capillaris, 251; C. clandestina, 247; C. curta, 246; C. davalliana, 241; C. depauperata, 252; C. digitata, 247; C. dioica, 241; C. distans, 254; C. divisa, 242; C. divulsa, 243; C. elongata, 245; C. extensa, 253; C. filiformis, 256; C. flava, 253; C. fulva, 252; C. glauca, 250; C. hirta, 255; C. incurva, 242; C. intermedia, 241; C. leporina, 246; C. lævigata, 253; C. limosa, 249; C. Melichioferi, C. montana, 255; C. muricata, 243; C. Oederi, 253; C. ovalis, 246; C. pallascens, 250; C. paludosa, 257; C. panicæa, 250; C. paniculata, 244; C. paradoxa,

244; *C. pauciflora*, 241; *C. pendula*, 251; *C. Persoonii*, 246; *C. pillulifera*, 255; *C. præcox*, 254; *C. Pseudo-cypærus*, 252; *C. pulcaris*, 241; *C. pulla*, 256; *C. punctata*, 254; *C. rariflora*, 249; *C. recurva*, 250; *C. remota*, 245; *C. rigida*, 249; *C. riparia*, 257; *C. rupestris*, 241; *C. saxatilis*, 256; *C. speirostachya*, 253; *C. stellulata*, 245; *C. stictocarpa*; *C. stricta*, 248; *C. strigosa*, 251; *C. sylvatica*, 252; *C. tenella*, 245; *C. teretiusecula*, 243; *C. tomentosa*, 255; *C. ustulata*, 250; *C. Vahlîi*, 246; *C. vesicaria*, 256; *C. vulgaris*, 248; *C. vulpina*, 242

Caricina, like a *Carex*.

Carinatus, keeled, fr. Lat. *carina*, a keel, a thin projection, also the two lower petals of a papilionaceous flower. (See Leguminiferae.)

Carlina, fr. *Carolus Magnus*, who used a root of this plant as a remedy against the plague then prevalent in his army, 503; *C. vulgaris*, 503

Carline thistle, 503

Carpellary, 31. The valves of the ovary are carpellary leaves.

Carpels, fr. *καρπος*, fruit, 28

Carpinus, fr. *carpo*, I cut or carve, hence carpenter, 354; *C. betulus*, like a beech, an adj. from *Betula*, 354

Carpinaefolius, a, um; or *florus*, a, um, terminating a word which is the name of a plant, denotes that the leaves or the flowers respectively are like those of the hornbeam, ivy, &c.

Carpology, fr. *καρπος*, and *λογος*, the laws regulating the structure of fruit, seed, &c., 28

Carpophore, fr. *καρπος*, fruit, and *φερω*, I bear, 27

Carrot, 598, 599

Carum, fr. *Caria*, where the plant abounds, 585; *C. Bulbocastanum*, 585; *C. carui* and *carvi*, fr. *χαρω*, and *φυλλον*, an estimable leaf or plant, 585; *C. verticillatum*, whorled, 585

Caryophyllaceæ, 22, 24, 31, 77, 81, 84, 86, 757

Caseine, 39

Castanea, fr. *Castana*, a town of Thessaly, celebrated for chestnuts, 353; *C. vulgaris*, 353

Catabrosa, fr. *καταβρωσις*, an eating out, *κατα*, and *βρωω*, in allusion to the truncate glumes, 221; *C. aquatica*, 222

Catchfly, 761, 764

Catharticus, a, um, cathartic, laxative.

Catkin, 335

Catmint, 428. *Cataria*, fr. Lat. *catus*, a cat, because cats are fond of it. The term cat prefixed does not mean a resemblance, but as opposed to dog, or contrasted with that other domestic favourite.

"If you set it the cats will eat it,
If you sow it the cats will not know it."

Cat's-ear, 533

Caucalis, fr. *κew*, I lie down, and *καυλος*, a stem, 600; *C. daucoides*, 600

Caudex, Lat., a trunk of a root or underground stem, 7

Celandine, a corruption of *χελιδων*, a swallow; *Scheelwort*, Westph. Gtios.; *Svale-urt*, Dan: so called because it is in flower when the swallows arrive. This plant was well known to our Teutonic ancestors. It is entered in the glossaries of northern nations, from that of Isidore down to modern times.

Celastraceæ, 737

Celery, 586

Cell, the primary element in plants, 1

Cellular, belonging to a cell.

Cellulars and cellulares, fr. *cella*, a cell. Plants chiefly composed of cellular tissue, 115

Cellular tissue, 115

Cenomyce, from *kenos*, empty, and *μυκος*, a fungus, in allusion to the empty cup-like fructification; a genus of Lichens, 158; *C. pyxidatus*, fr. *πιξ*, or *πυξ*, a little chest, in allusion to the *theca* (spore-cases), 158; *C. rangiferina*, fr. *rangifer*, a reindeer, reindeer moss, 158

Centaurea and *Centaureum*, 7, 26, 56, 57

Centaurea, from Lat. *centum*, a hundred, 508. "*Cecropiumque thymum, et graveolentia centaurea*," Virg. *Geo.* iv. 270. *C. calcitrapa*, fr. *calcitro*, 510 (see *Calcitrapa*, ante); *C. cyæus*, fr. *κυανος*, blue, 510; *C. Isnardi*, *nomen honoris*, Isnard, a French botanist, 1720, 511; *C. Jaceæ*, 509; *C. nigra*, 509; *C. scabiosa*, 510; *C. solstitialis*, said to flower at the summer solstice, 510

Centaureum, 21

For *Centaureas* read *centaureas*, 50

Centaur, 480, 481

Centranthus, fr. *κεντρον*, a spur, and *ανθος*, a flower, 555; *C. calcitrapa*, 555; *C. ruber*, 555

Centunculus, a dim. of *cento*, a patched coverlet, because it covered the fields, 412; *C. minimus*, 412

Cephalanthera, fr. *κεφαλη*, the head, and *ανθερα*, 324; *C. ensifolia*, fr. *ensis*, a sword, and *folium*, a leaf, 324; *C. grandiflora*, 24; *C. rubra*, 324

Cerastium, fr. *κερας*, a horn, to which the capsule bears some resemblance, 774; *C. alpinum*, 775; *C. arvense*, 775; *C. glomeratum*, 56, 774; *C. laeifolium*, 775; *C. semidecandrum* (half of ten stamens), 774; *C. tetrandrum*, 774; *C. trigynum*, 775; *C. triviale*, 774

Ceratophyllaceæ and *Ceratophyllum*, fr. *κερας*, a horn, and *φυλλον*, a leaf (the leaves are like little horns), 372; *C. demersum*, 372; *C. submersum*, 372. Both terms denote the being under water.

Ceterach, probably fr. the Arabic, *keterach*, (Persian ?), 186

Cernuus, a, um, drooping.

Cetraria, fr. *cetra*, a little target, which the fructification is thought to resemble, island moss; *C. islandica*, 158

Chærophylllum, fr. *χαρω*, I esteem, and *φυλλον*, a leaf, an estimable plant, 602; *C. aromaticum*, 603; *C. aureum*, 603; *C. temulentum*, 602

- Chaffweed, 412
 Chalaza, where the nucleus of the seed joins the integuments, 29
 Chamomile, fr. *χαμαι*, on the ground, 513, 514
 Chamomile, corn, 52
 Chara and Characeæ, fr. *chara*, an edible root, *Cæsar Bel. Civ.* iii., 48; *C. aspera*, rough, 166; *C. crinita*, fr. *crinis*, hair, 167; *C. fragilis*, 167; *C. hispida*, 166; *C. hispidula*, 166; *C. tomentosa*, 166; *C. vulgaris*, 166
 Characias, said to be fr. *χαρὰξ*, a valley where this kind of spurge commonly grows.
 Charlock, 703
 Chelidonium, fr. *χελιδών*, a swallow, a bird which arrives when this plant begins to blossom, 726; *C. majus*, 726
 Cheese-renning, *Galium verum*, 560
 Cheiranthus, fr. Arabic *kheiry*, and *avθos*, a barbarism, according to philologists, 692; *C. Cheiri*, 692
 Chenopodiaceæ and Chenopodium, fr. *χην*, a goose, and *πους*, a foot, 48, 82, 85, 110, 383; *C. album*, 385; *C. Bonus Henri-cus*, 387; *C. Botrys*, 387; *C. botryodes*, 386; *C. ficifolium*, 385; *C. glaucum*, 387; *C. hybridum*, 386; *C. murale*, 386; *C. olidum*, 384; *C. opulifolium*, 387; *C. polyspermum*, 384; *C. rubrum*, 386; *C. urbicum*, 386; *C. viride*, 385
 Cherry, 54, 619
 Cnervil, 603
 Chestnut, 353
 Chicory, 532, 533
 Chickweed, winter-green, 409, 410
 Chickweed, 56, 706
 Chives, 302
 Culora, fr. *χλωρος*, greenish yellow, 483; *C. perfoliata*, 483
 Chlorantha, having greenish-yellow flowers.
 Chondrus (Irish moss), fr. *χονδρος*, a gristle, in allusion to the cartilaginous or gristly nature of the plants.
 Chry-anthemum, fr. *χρυσος*, golden, and *avθos*, flower, 517; *C. coronarium*, 517; *C. segetum*, 517
 Chrysocoma, fr. *χρυσος*, and *κομα*, hair, golden hair, 526; *C. Linosyris*, fr. *λινον*, flax, and *Syros*, one of the Cycladian Isles, 526
 Chryso-plegium, fr. *χρυσος*, gold, and *σπλην*, a disease, valuable in splenetic complaints, 574; *C. alternifolium*, 574; *C. oppositifolium*, 574
 Cicely, 603
 Cicendia, fr. Lat. *cis* and *candeo*, cicindela, a glow-worm, hence candle; *C. filiformis*, 483; *C. Candolii*, 483
 Cichoraceæ, 71. (See *Ligulifloræ*).
 Cichorium, Arabic *chikouryeh*, 532; *C. Intybus*, "Amaris intuba fibris," Virg. 533
 Cicuta and Cicuteæ, fr. Lat. *cicō*, or *quatio*. I cause to shake, 581. *Cicuta* was a plant with a hollow stem, of which the Italian shepherds made pipes, "Sep'em compactis cicutis fistula," a whistle; Scottice. *fussle*; *C. virosa*, fr. *virus*, poison, 6, 584
 Ciliatum, a, um, fr. *cilium*, a fringe, eyelash, fringed, commonly written by botanists as if the original were *cilia*, gen. *ciliae*. It is *cilium*, *cilii*, nom. pl. *cilia*, not *ciliae*.
 Cineraria, fr. *cinis*, ashes, 527; *C. campestris*, 527
 Cinereus, a, um, fr. Lat. *cinis*, ashes, of a pale ash-like colour.
 Cinquefoil, *quinque*, five, and *folium*, leaf, 621, 622, 625
 Circæa and Circææ, fr. *Circe*, the sorceress, 611; *C. alpina*, 612; *C. lutetiana*, 611
 Circinate, fr. *circus*, round, and *natus*, grown, coiled or curled up like the top of a crook or crosier. (See Ferns.)
 Circulation, 37
 Cistaceæ, fr. *cistus*, a plant described by Pliny, 689
 Citratus, a, um, fr. Lat. *citreum*, a citron or lemon, lemon-scented.
 Cladium, fr. *κλαδος*, 263; *C. Mariscus*, 263
 Clary, 421, 422
 Clate; A. S., a *bur*. Clay, fat, adhesive soil, and clammy, are probably from the same root. Agrimony is called a *bur*, because it also sticks. *Lappa* is the *grote lediken* of the ancient Germans. *Clat* is also a synonyme of *clod*, 507
 Clavaria, fr. *clava*, a club, in allusion to the shape of some of the species, 156
 Clavatum, club-shaped. (See *supra*.)
 Claviculata, fr. Lat. *clavis*, dim. a tendril or little shoot, whereby it lays hold of objects.
 Claw, 24
 Claytonia, in memory of Mr. J. Clayton, an American botanist, and correspondent of Gronovius, 655; *C. perfoliata*, 655
 Clematideæ and Clematis, fr. *κλημα*, a vine-shoot, and *Clematitis*, 780; *C. vitalba*, 780
 Clinopodium, fr. *κλινοπους*, bed-foot, because the trusses of flowers resemble the knops with which couches were anciently adorned. (See *Calamintha*, 808).
 Clover, fr. A. S. *clifian*, to cleave, hence *clafweryt*, because the leaves are divided. Cliffe is the herb Agrimony, in which the leaves are divided.
 Cloudberry, 638
 Cochlearia, fr. Lat. *cochleare*, a spoon, in allusion to the shape of the leaves, 709; *C. anglica*, 709; *C. danica*, 709; *C. officinalis*, 709
 Cockle. When the great St. Bernard founded his benedictine abbey at Clairvaux, he and his thirteen companions lived on barley- or cockle-bread, with boiled beech leaves for vegetables, while they were employed in grubbing up the forest and in building huts for their habitation. *Thomas. Disc. Eccl.* iii. 513
 Codlings-and-cream, a species of willow-herb, smelling, they say, like the above-named dainties, 24
 Cœnosus, a, um, fr. Lat. *cœnum*, mire, applied to plants growing in miry parts.

- Cœruleus*, a, um, fr. Lat. *cœlum*, and *coeruleus*, blue or bluish.
- Colchicum*, fr. *Colchis*, where these plants abound, 294; *C. autumnale*, 295
- Collina*, fr. Lat. *collis*, a hill.
- Colorata*, coloured, fr. Lat. *color*, colour.
- Colt's-foot*, 51, 530
- Columbaria* and *Columbinum*, fr. Lat. *columba*, a pigeon- or dove-house, and belonging to a dove.
- Columbine*, stone-blue or deep night-brown, 31, 789, 790
- Comarum*. The fruit of this plant resembles that of the *Arbutus*, once so called.
- Comfrey*, 50, 466
- Common Ling*, 50, 490
- Common Parsnep*, 596, 597
- Commutatus*, changed, a name bestowed on plants which are but doubtfully distinct from previously known species.
- Comosus*, a, um, fr. Lat. *coma*, very hairy or leafy.
- Compositæ*, fr. *con*, together, and *pono*, I place, *positus*, placed, 21, 33, 39, 89, 90, 110, 501, 502
- Conservæ*, *conserva*, fr. *conservare*, to heal or grow together, a water Algal, once supposed to be conducive to the coalescing of broken bones, 155
- Congestus*, a, um, heaped or piled together, fr. Lat. *congerere*, to heap.
- Coniferae*, fr. Lat. *conus*, a cone, and *fero*, I bear, in allusion to the sometimes cone-shaped fruit produced by trees and shrubs of this order, 2, 10, 39, 332
- Conium*, fr. *κονειον* and *κωνειον*, *Cicuta*; *C. maculatum*, 604
- Connate*, fr. *con*, together, and *nascor*, I grow together, 17
- Connective*, the part between the anther-cells, and to which they adhere, 27
- Consolida*, *wunden kruit*, a vulnerary, 790
- Convallaria*, fr. *vallis*, a valley, where these plants grow, 305; *C. majalis* or *maialis*, fr. *Maia*, 306. "Rura mihi et rigui placeant in vallibus amnes," Virg.
- Convolvulaceæ*, *Convolvulus*, fr. *volvo*, I wind round, 50, 70, 475; *C. arvensis*, 476; *C. sepium*, 476; *C. Soldanella*, 477
- Coralwort*, 695
- Corallorhiza*, fr. *κοραλλιον*, coral, and *ρίζα*, root, 312; *C. innata*, 312
- Cordata*, us, um, heart-shaped, fr. Lat. *cor*, the heart.
- Cordate*, fr. *cor*, the heart, 13
- Coriander*, fr. *κορις*, a bug, which the plant exceeds in its fetid smell, 605
- Coriandrum*, *κοριανον*, fr. *κορις*, a bug (see *supra*); *C. sativum*, 605
- Corn*, fr. *κορμος*, an underground stem, 7
- Cornaceæ* and *Cornus*, fr. Lat. *cornu*, a horn, because the wood is hard, 570; *C. sanguinea*, 570; *C. suecica* (Swedish), 570
- Corn-cockle*, 513. (See *Cockle*.)
- Cornel*, *Prick* or *Gatterwood*, fr. Lat. *cornu*, a horn, so named because the wood is hard, 570
- Corn-flag*, 331
- Corn-salad*, 557
- Corn-parsley*, 584
- Corolla*, fr. Lat. *corona*, a little crown, 23
- Coronilla*, fr. *corona*, a crown, 684
- Coronopus*, fr. *κοραῖς*, a crow, and *πους*, a foot, 51
- Corrigiola*, fr. Lat. *corrigia*, a thong, and *corium*, leather, from which thongs are cut, in allusion to the strap-shaped leaves of the species, 652; *C. littoralis*, 653
- Corydalis*, fr. *κορυδός* and *κορυς*, crested lark, in allusion to the shape of the flowers, 720. The accent should be on the antepenultimate syllable *ry*. (See rule under *Bicolor*.) *C. claviculata*, fr. *clavicula*, a tendril (*clavis*), 720; *C. lutea*, 720; *C. solida*, 720
- Corylaceæ* and *Corylus*, fr. *καρυα*, a nut-tree, hence *core*, 351, 354
- Corymbiferae*, fr. *corymbus*, and *fero*, I bear, 511
- Corymb*, 20, 22. (See *Inflorescence*.)
- Corynephorus*, fr. *κορυνη*, a club, and *φερω*, I bear, 212; *C. canescens*, 212
- Cotoneaster*, fr. *κυδωνιον*, a quince, 614; *C. vulgaris*, 614
- Cotton-thistle*, 502
- Cotton-weed*, 514, 519
- Cotula*, dim. fr. *cota*, 513. (See *Anthemis*.)
- Cotyledon*, fr. *κοτυληδων*, 31, 648; *C. umbilicus*, 648
- Cowbane* is *Cicuta*, 584. Cow, dog, goat, goose, hare, hen, and horse, form no small part of the popular nomenclature.
- Cowberry* is *Vaccinium*, 493
- Cow's-lungwort* is *Verbascum Thapsus*, 458
- Cow-parsley* and *Cow-parsnep*, 53, 597
- Cowquake* is *Briza*, 225
- Cowslip*, 406
- Cow-weed*, *Chærophyllum sylvestre*, 602
- Cow-wheat*, 451
- Crab*, 614
- Cracca*, or *Crack-vetch*, Belg. *crack*, 677
- Crakeberry*, *Crowberry*, 360
- Crambe*, fr. *κραμβος*, 718; *C. maritima*, 718
- Cranberry*; *Cranberries*, or *Moss-berries*, or *Moorberries*, 495
- Crane's-bill*, 747, 751
- Crassulaceæ*, 647
- Cratægus*, fr. *κρατος*, strength; the wood is very durable, 613; *C. oxyacantha*, fr. *οἶγος*, sharp, and *ακανθος*, a thorn, 613
- Crenate*, *Crenulate*, fr. *crenatus*, notched or scalloped, and *crenulatus*, slightly notched or scalloped, 14
- Crepis*, fr. *κρηπις*, slipper, 540; *C. biennis*, 541; *C. foetida*, 540; *C. paludosa*, 542; *C. setosa*, 541; *C. succisifolia*, 542; *C. taraxacifolia*, 540; *C. virens*, 542
- Cress*, 693, 694, 695, 696, 697
- Cress*, *Kerse* of the ancient glossaries. *Aberdonic wall* (well or water) *gers* or *girse* (grass); wall-girse = water-cresses, not *crisses*, as cried in London streets, and sometimes pronounced by better-taught folks than London male and female cadgers (*caupones circumferanei*, &c.), 715

- Cress-rocket, 711
 Crinita, us, a, um, fr. *crinis*, hair, that which is hairy.
 Crispus, a, um, curled, crisp, 14
 Cristatus, a, um, crested, fr. *crista*, a crest.
 Crithmum, fr. *κριθῆ*, barley, to which the fruit has some similarity, 594; *C. maritimum*, 594
 Crocus, fr. *κροκος*, 328, 329; *C. nudiflorus*, 329; *C. sativus*, 329; *C. vernus*, 329
 Cross-leaved heath, 50, 489
 Crosswort, 560
 Crowberry, because crows do not eat it (?).
 Crowfoot, 25, 779, 780, 783, 787
 Crow-garlic, 302
 Crown of root, 7
 Cruciatu, a, um, cruciate, the parts disposed crossways, and forming a cross.
 Cruciferae, fr. *crux*, a cross, and *fero*, 24, 28, 32, 56, 77, 84, 86, 89, 90, 129, 691
 Crus-galli, cock's-leg or foot.
 Crypsis, fr. *κρυψις*, concealing; the flowers are partly hidden in the sheaths; *C. aculeata*, *C. schænoides*, 200
 Cryptogamia, fr. *κρυπτος*, concealed, and *γamos*, union; organs of fructification invisible or concealed, 24, 153
 Cuckoo-flower, 57, 764
 Cucubalus, fr. *cucubare* (?), to hoot like an owl, a dismal sound; the berries of the plant are said to be poisonous or dangerous, 765; *C. bacciferus*, fr. *bacca*, a berry, and *fero*, 765
 Cucurbitaceæ, fr. *cucurba*, a cable, to which the spreading shoots and the fruit bear some resemblance, 10, 567
 Cudweed, 519, 520, 521, 522
 Cupressineæ, fr. *cupressus* and *κυπαρισσος*, a cypress-tree.
 Currant, a corruption of Corinth; the berries resemble currants in both shape and size, 571, 572, 573
 Curta, us, um, short.
 Cuscutaceæ, Cuscuta; Castuca and Kassutha, ancient glossary, 473; *C. Epilinum*, 474; *C. europæa*, 473; *C. Epithymum*, fr. *επι*, on, and *thymum*, thyme, 474; *C. hassiaca*, 475; *C. Trifolii*, 474
 Cuspidatus, a, um, fr. *cuspis*, a point, tapering into a hard point.
 Cyanus, a, um, fr. *κυανος*, blue.
 Cyclamen, fr. *κυκλαμινος*, sow-bread, 405; *C. hederæfolium*, 408
 Cymbalaria, a plant like ivy.
 Cyme, fr. *κυμα*, a sprout. (See Inflorescence.)
 Cynapium (dog's-parsley), 589
 Cynaracephaleæ, fr. *κυναρα*, an artichoke, *cynara*, and *κεφαλή*, a head, 502
 Cynodon, fr. *κυν*, dog, and *οδους*, tooth, 201; *C. Dactylon*, fr. *δακτυλον*, a finger, in allusion to the digitate spikelets, 201
 Cyoglossum, fr. *κυν* and *γλωσσα*, dog's-tongue, 472; *C. officinale*, 472; *C. sylvaticum*, 472
 Cynosurus, fr. *κυν*, and *ουρα*, a tail, dog's-tail; *C. cristatus*, 226; *C. echinatus*, 226
 Cyperaceæ and Cyperus, an order and genus of Monocotyledons, fr. *κυπερος*, a reed, a name given to some kindred plant, 19, 62, 129, 130, 239, 265; *C. fuscus*, 265; *C. longus*, 265
 Cyripediceæ and Cyripedium, fr. *κυρις*, a slipper, 324; *C. calceolus*, a little shoe, 324
 Cystopteris, fr. *κυστος*, a chest, and *περις*, a fern, 180; *C. alpina*, 181; *C. fragilis*, 181; *C. montana*, 181
 Daboëcia, named fr. St. Dabeoc, an Irish saint, 491; *D. polifolia*, 491
 Daboec's, St., Heath, 491
 Dactylis, fr. *δακτυλος* or *δακτυλις*, a finger; *D. glomerata*, 226
 Daffodil, 326. "Bid daffodillies fill their cups with tears," Milton.
 Daisy, Dan *Tu sind-fryd* 51, 517
 Daisy, Michaelmas, 524
 Damasonium, fr. *δαμασ*, I subdue. It was an ancient specific.
 Dandelion, "sunflower of the spring," fr. *Fr. dent-de-lion*, 51, 535. The jagged leaves are said to resemble the lion's teeth.
 Danewort, Dan. *Sommer-hyld*, 565
 Daphne, a poetic-mythic name, fr. *Daphne*, a nymph changed into a laurel, 359; *D. Laureola*, little laurel, 112, 360; *D. Mezereum*, fr. *μεζαριον*, fr. the Persian, not the laurel sacred to Apollo, 360
 Datura, fr. *datora* and *tatura*, an Arabic name of some plant, 463; *D. Stramonium*, fr. *sterno*, 463
 Daucineæ and Daucus, 598; *δαυκος*, Diosc., 599, fr. *δαυ*, I warm; *D. carota*, fr. *Fr. carotte*, 599; *D. maritimus*, 599
 Dead-men's-bells = Foxglove.
 Dead Nettle, 427
 Deciduus, a, um, *deciduus*, falling off as the leaves in autumn; opposed to evergreen.
 Decipiens, fr. Lat. *decipio*, I deceive; a fit name for an ambiguous species.
 Decumbens, fr. Lat. *decumbo*, I recline, rising up at the point.
 Decurrent, fr. *de* and *curro*, running down the stem; prolonged beyond the point where the leaf is attached to the stem.
 Decussate, in pairs that alternately cross each other, 17
 Dehiscence, fr. *dehisco*, I open, 31
 Delphinium, fr. *δελφιν*, a dolphin, to which the upper calyx-leaf has a likeness, 790; *D. Consolida*, so called because of its reputed vulnerary properties, 790
 Deltoides, like the Greek letter Δ.
 Densus, a, um, close.
 Dentaria, fr. Lat. *dens*, a tooth, 695; *D. bulbifer*, bulb-bearing, 695; *ferus*, a, um, denotes bearing.
 Dentatus, a, um, and Denticulatus, toothed and slightly toothed, fr. Lat. *dens*, a tooth.
 Denudatus, a, um, fr. *nudus*, naked.
 Depuperatus, a, um, fr. Lat. *pauper*, poor, starved, abortive in some part.
 Desmidiæ, fr. *δεσμος*, a bond, fr. *δεω*, I

- bind, in allusion to the union of the filaments, 155
- Devil's-bit, *Druceles-bit*, ancient glossary; Dan. *Dievil s-bit*, a plant of high repute in the middle ages, 554
- Dewberry, 54, 636
- Diadelphous, fr. *dis*, two, and *αδελφος*, a brother, 26
- Diandrus, a, um, fr. *dis*, two, and *ανερ*, a stamen; *triandrous*, having three stamens, *tetrandrous*, four stamens, &c.
- Dianthus, fr. *Zeus*, gen. *dios*, and *ανθος*, divine flower, 758; D. *Armeria*, 759; D. *cæsius*, 760; D. *Caryophyllus*, fr. *καρυοφυλλον*, a clove-pink, 760; D. *deltoides* (?), because the letter Δ is inscribed on the petals, 759; D. *pumarius*, 750; D. *prolifer*, fr. Lat. *proles*, a race, and *fero*, I bear, 760
- Diaphanous, transparent, fr. *δια*, through, and *φαινομαι*, I appear.
- Diatomaceæ, fr. *δια*, across, and *τεμνω*, I cut, 155
- Dichlanthydeæ, *dis*, two, and *χλαμυς*, coat, or covering, having two floral envelopes, 398
- Dicotylédons, fr. *dis*, two, and *κοτυληδων*, having two cotyledonary leaves or seedlobes, 116, 131, 332
- Dictyogens, netted, fr. *δικτυς*, a net, and *γινεσθαι*, to be, 19
- Diffusus, a, um, spread.
- Digitalis, fr. Lat. *digitus* and *digitale*, a finger, finger of a glove, 446; D. *purpurea*, 447
- Digitaria, in allusion to the disposition of the spikelets, 193; D. *humifusa*, 194; D. *sanguinalis*, 194
- Digitatus, a, um, fr. Lat. *digitus*, a finger, having five lobes.
- Digynus, a, um, fr. *dis*, two, and *γυνη*, style, having two styles.
- Dilatata, us, um, fr. Lat. *dilato*, I enlarge in width.
- Dillesk (in Ireland), an eatable sea-weed; Dulse (Scotland), 155
- Diceious, fr. *dis*, two, and *οικος*, house, 70
- Dioica, fr. *dis*, two, and *οικος*, house, hence diœcious, q. v., 23, 70, 335
- Diotis, fr. *dis*, two, and *ους*, gen. *οτις*, ear, two-eared, 514; D. *maritima*, 515
- Diplotaxis, fr. *διπλος*, *διπλους*, double, and *ταξις*, rank; the seeds are in two rows, 705; D. *erucoides*, 706; D. *muralis*, 706; D. *tenuifolia*, 706
- Dipsacæ and Dipsacus, fr. *διψω*, I am thirsty, 23, 33, 129, 552; D. *fullonum*, 553; D. *pilosus*, 553; D. *sylvestris*, 553
- + Dioscoreaceæ, fr. *Dioscorides*.
- Dissepiment, fr. *di*, apart, and *sepio*, I separate, 30
- Distans, fr. *distat*, is distant.
- Distichous, fr. *dis*, two, and *στιχη*, rank, in two rows, 17
- Divisus, a, um, divided.
- Divulus, a, um, distant, fr. *divellere*, to put asunder.
- Dock, Dan. *skræppe*, *rhubar*, 379
- Dodder, 473, 475; Dodder, great, 50; *Doder castuca*, ancient glossary.
- Dogbane, 559; Dogberry (Cornel), Dogberry is *Solanum nigrum*, 570; Dogbramble is not raspberry, 633; Dog-brier is *Rosa canina*, 640; Dog's-cabbage, *Cynocrambe*, Mercury, 366; Dog's-chamomile is Dog-daisy, 514; Dog's-fennel is Dog's-parsley (?), 589; Dog's-grass (*Ag. canina*), 204; Dog's-mercury, *Cynocrambe dicta* (Ray), 366; Dog's-parsley, or Fool's-parsley, 589; Dog-rose, 54, is *R. canina*, 640; Dog's-tail, 225; Dog's-tongue, 472; Dog's-tooth, 201; Dog's-wheat, 235; Dog-wood, 570. The names of both domestic and wild animals enter largely into the popular nomenclature of plants, e. g., ass, bear, cat, cow, dog, fox, hare, horse, lion, mare, ox, sow, wolf, &c.; also the names of fowls, as the general term *bird*, crane, dove, duck, goose, hen, stork. Names of plants are derived from the insect tribes, as bee, flea, drone, fly, spider, &c. Sometimes the resemblances are real, sometimes fanciful. The term *dog* is generally applied to worthless or poisonous species, as dog-daisy (stinking chamomile), dog-grass, dog's-cabbage, dog's-violet (because it has no smell), dog's-parsley (a poison), &c. *Horse* is often the name of what is large; *Dog* of what is worthless or dangerous.
- Domesticus, a, um, fr. Lat. *domus*, a house, cultivated; *Prunus domestica*, in opposition to *P. spinosa*.
- Doronicum, fr. *δωρον*, and *νικη*, excellent, surpassing (Linn.); Doronigi, an Arab name, 526; D. *Pardalianches*, fr. *παρδαλος*, a leopard, leaves spotted, 526; D. *plantagineum*, 526
- Dorsal, fr. Lat. *dorsum*, belonging to the back.
- Dove's-foot, 750
- Draba, fr. *δραβη*, acrid, 707; D. *aizoides* (see *aizoides*), 708; D. *incana*, 708; D. *muralis*, 708; D. *rupestris*, 708; D. *verna*, 708
- Dropwort, 621; Dropwort, Water, 591
- Drosera and Droseraceæ, fr. *δροσος*, dew, with which the plant is always furnished, 55, 729; D. *anglica*, 730; D. *intermedia*, 730; D. *rotundifolia*, 729
- Dubius, a, um, doubtful.
- Dryas, fr. *δρυς*, an oak, in allusion to the shape of the leaves, 638; D. *octopetala*, having eight petals, 638
- Duckweed, or duck's-meat, 280, 281
- Dumetal and septal plants, 81
- Dumetorum, fr. *dumetum*, a bushy place, and *dumus*, a bush, and *δωω*, I shade.
- Duramen, 37
- Duration of plants, 64
- Durmast, 353
- Durus and Duruscula, us, um, hard, rigid, and rather hard, or somewhat rigid.
- Dutch rushes, *Equisetum hiemale*, 172; *rectius scribitur hiems quam hyems et hiemalis quam hyemalis*.

Dyer's Rocket, 728; Dyer's Weed, 659; Dyer's Wood, 717

Ebūlus, Dwarf elder, or Wallwort, or Dane-wort. *Ebuli fumo fugantur serpentes*—The smoke of this plant drove away serpents.—Pliny, xxv. 10. It was anciently believed to have sprung up in places where Danes were slaughtered, and hence was called Androsæmon, man's blood.

Echinatus, a, um, bristling like a hedgehog, fr. *εχινος*, a hedgehog.

Echinophora, fr. *εχινος*, a hedgehog, and *φερω*, I bear, 605. The plant bears spines like a hedgehog. E. spinosa, 605

Echium, fr. *εχis*, a serpent, for the sting of which the plant was a specific, 471; E. vulgare, 471; E. violaceum, 471

Effusus, a, um, fr. *e*, and *fundere*, to spread from.

Eglantine, 641. Sweet-briar of Shakspeare and our older poets:—

"And leaf of eglantine, whom not to slander,

Moutsweetened not thy breath."

Milton calls the honeysuckle by this name:

"Through the sweet-briar or the vine,
Or the twisted eglantine."

Elæagnaceæ, fr. *ελαιον*, oil, 358

Elatior, fr. Lat. *elatus*, lofty, *elatior*, loftier.

Elecampane, fr. *εκλεγμα* (*εκλειχω*, I lick or suck), a pulmonary or cough medicine, 523. Electuary is from the same root. This plant was famed in ancient pharmacy.

Elder, 52, 565

Elm, 371, 372

Elongatus, a, um, and elongate, prolonged or lengthened.

Elsholtzia cristata, 437

Elymus, fr. *Elyma*, in Greece, where these grasses were abundant; E. arenarius, 237; E. geniculatus, 238

Elyna, fr. *ελυω*, I cover; E. caricina, fr. *carex*, like a *Carex*, 257

Echioides, like an Echium.

Elæinaceæ, fr. *ελατη*, a pine, which it does not resemble, 754; Elatine, 755; E. hexandra, 755; E. Hydrōpiper, fr. *υδωρ*, and *πiper*, pepper, 755. The accent should be on the antepenult. (See Bicolor.) The *i* in elatine is long, being preceded by a short syllable, *ελατή*.

Emarginate, slightly notched, 14

Embryo, fr. *εμβρυος*, the germ or rudiment of the future plant while in the seed, 31

Embryonate, having an embryo, not a spore, 116

Empetraceæ and Empetrum, fr. *εμπετρον*, a reputed remedy for the stone, hence the name, 360; E. nigrum, 360

Enarthrocarpus lyratus, fr. *εναρθρος*, jointed, and *καρπος*, fruit; the pods are jointed, 719

Enchanter's nightshade, 611, 612

Endocarp, fr. *ενδος*, within, and *καρπος*, fruit, 30

Endogens, and Endogenous, fr. *ενδος*, within, and *γενεσθαι*, to grow, increasing from the interior, 9, 10, 19, 32, 119, 116, 131

Ensifolius, a, um, long and narrow-leaved, fr. Lat. *ensis*, a sword, and *folium*, a leaf. (See Iris.)

Epigejos, fr. *επι*, on, and *γαια*, earth, not growing in water, as the common reed does.

Epigynous, fr. *επι*, on, and *γυνη*, the ovary, 3, 26

Epilobium, fr. *επι*, on, and *λοβος*, a pod, 607; E. alpinum, 610; E. alsinifolium, 610; E. anagallidifolium, 610; E. angustifolium, 608; E. hirsutum, 608; E. montanum, 608; E. palustre, 609; E. parviflorum, 608; E. roseum, 610; E. rosmarinifolium, 608; E. tetragynum, 609

Epimedium, and *επιμηδιον*, the name of some plant described by Pliny, 778; E. alpinum, 779

Epipactis, fr. *επι*, upon, and *πακτις*, pointed elevation. (See "Phytologist," N. S., vol. i., p. 415.) E. latifolia, 323; E. media, 323; E. ovalis, 323; E. palustris, 323; E. purpurata, 323.

Epipogium, fr. *επι*, and *πωγος*, beard, 313; E. aphyllum, fr. *a*, not, and *φυλλον*, leaf, leafless. Correct in text, *apphyllum*, 313

Epithymum, fr. *επι*, upon, and *θυμος*, thyme, growing on thyme, &c.

Equisetaceæ and Equisetum, fr. Lat. *equus*, a horse, and *seta*, a hair, in allusion to the hair-like branches of the species, 119, 169; E. arvense, 169; E. hiemale, fr. *hiems*, winter, because the species remain green in that season, 172; E. limosum, 171; E. Mackaii, 172; E. Moorei, 172; E. palustre, 171; E. sylvaticum, 171; E. Telmateia, 170; E. umbrosum, 170; E. variegatum, 172

Equant, fr. Lat. *equito*, I ride, 18. (See Iris, 329.)

Erectus, Lat., erect, upright.

Erica and Ericaceæ, fr. *ερικω*, I break, 489; E. ciliaris, 490; E. cinérea, 50, 489; E. Mackaiana, 489; E. mediterranea, 490; E. Tétrálix, cross, 489; E. vagans, 490

Eranthis, fr. *ηρ*, early, and *ανθος*, flower, early flowerer; E. hiemalis, 789

Ericetal plants, 82

Erigeron, fr. *ερι* or *εap* or *ηρ*, early, and *γερον*, old, in allusion to the receptacle, which soon becomes like a bald head, 525; E. acris, 526; E. alpinus, 525; E. canadensis, the name of the province from which it was originally introduced, 525

Eriocarpa, fr. *εριον*, wool, and *καρπος*, fruit.

Eriocaulaceæ, and Eriocaulon, fr. *εριον*, wool, and *καυλος*, stem, woolly-stemmed plants, 191, 275; E. septangulare, 275

Eriophorum, fr. *εριον*, wool, and *φερω*, I bear; E. alpinum, 265; E. angustifolium, 264; E. grácilé, 264; E. latifolium, 264; E. vaginatum, fr. Lat. *vagina*, a sheath, 264

Erodium, fr. Lat. *erodius*, a stork or heron,

- in allusion to the beaked fruit, 751; *E. cicutarium*, 752; *E. ciconum*, fr. *ciconia*, a stork, 752; *E. littoreum*, 752; *E. maritimum*, 752; *E. moschatum*, 752
- Eruca*, fr. Lat., *aptum est erucas vitare salaces*, 705; *E. sativa*, 705
- Eryngium*, fr. *ερυγγιον* and *ερυγειν*, from its supposed efficacy in flatulent disorders, hence *eructatio* and *eructation*, 580; *E. campestre*, 581; *E. maritimum*, 581
- Eryngo*, Dan. *hundrede-hoved*, 6
- Erysimum*, fr. *ερως*, I cure, in allusion to the curative qualities of the plants, 699; *E. cheiranthoides*, 699; *E. orientale*, 699
- Erythraea*, fr. *ερυθρος*, red, 21, 480; *E. Centaurium* (*centaurea*, Virg.), 480; *E. latifolia*, 481; *E. linariaefolia*, 481; *E. pulchella*, 480
- Eufragia*, fr. *ευ*, and *φραζω*, I speak well of, I praise, 453; *E. viscosa*, 453
- Eupatorium*, name fr. *Eupator*, a king of Pontus, 529; *E. cannabinum*, 530
- Euphorbia* and *Euphorbiaceae*, name fr. *Euphorbus*, a medical botanist, 361; *E. amygdaloides*, like an almond, *sic lucus a non lucendo*, 110, 365; *E. characias*, fr. *χαράκις*, 365; *E. coralloides*, 363; *E. cyprissias*, *κυπρισσίας*, Diosc., 364; *E. Eula*, 364, fr. Cel. *esu*, acrid; *E. exigua*, 363; *E. helioscopia*, fr. *ηλιος*, sun, and *σκοπεῖν*, to regard, or look at, 362; *E. hiberna* (Irish? employed in Ireland for poisoning fish), 362; *E. Lathyrus*, Cross-leaved Spurge or Caper-plant, 364; *E. paralias*, *παρα*, by or near, and *αλς*, the sea, 364; *E. Peplis*, fr. *πεπλις*, *πεπλιον*, and *πεπλος*, Greek names of spurge, 365; *E. Peplus*, 363; *E. pilosa*, 363; *E. platyphylla*, 362; *E. portlandica*, fr. Portland Island, where the plant grows, 363; *E. palustris*, 363; *E. stricta*, 362
- Euonymus* fr. *ευ*, good, and *ονομος*, repute. Smith says by antiphrasis, because worthless, *sic parca, quia non parcant*, 737; *E. europaeus*, 737
- Euphrasia*, fr. *ευ*, and *φραζω*, I praise, a commendable plant, 453; *E. officinalis*, 453
- Evening primrose, 607, 611
- Exembryonate, 115
- Exiguus, a, um, small, little.
- Exogens, fr. *εξ* and *γενεσθαι*, to grow by external additions, 10, 335
- Extensus, a, um, extended.
- Eye-bright, Dan. *oyen-trost* (eye-comforter), 453
- Fagopyrum, Eng. *buck-wheat*, 'Ger. *buckweizen*, Dan. *bog-hvede* (beech-wheat), 379; *F. vulgare*, Polygonum Fagopyrum, q. v., 379
- Fagus, fr. *φηγος*, *φαγω*, I eat, 352; *F. sylvatica*, 352
- Falcatus, a, um, hooked, fr. Lat. *falx*, a hook.
- Farfara, fr. Heb. *var.* a general word including all kinds of corn, hence Lat. *far*, corn, and *farfara*, a plant, growing among corn (*seges*, not *far*).
- Fastigiatus, a, um, pointed. The Lombardy poplar is an example of what is called a fastigiate plant, the branches being all erect (pointing upwards).
- Farinaceous, fr. *farina*, containing farina.
- Fatuus, a, um, insipid, *betæ fatuæ*, insipid roots.
- Featherweed, 606
- Fedia (Valerianella), 52; *V. olitoria*, fr. Lat. *olus*, an herb, 52
- Fellwort is Gentian, q. v., 482
- Fennel, fr. *feniculum*, Mid. Ger. *fënechel*, and *fëngel*, Dan. *fennikel*, and W. Glos. *venekol*, 593
- Fern, A. S. *fearn*, fr. Mid. Ger. *varn*, O. Ger. *faran*, the primary sense of which is *motion* from one part to another, and hence *extension* and *distribution* are implied in the term applied to Ferns, because they are universally distributed in the North, where this name originated, 81, 173—190
- Ferruginous, a, um, fr. Lat. *ferrum*, iron, having a rusty appearance.
- Festuca and Festuceæ, Cel. *fest*, and Lat. *pascua*, and Eng. *pasture*, are ad from the same root as *Festuca*, a genus of pasture-grasses. *F. arundinacea*, 228; *F. bromoides*, *βρωμος* and *ειδω*, bromus-like, 227; *F. gigantea*, 228; *F. ovina*, fr. *ovis*, a sheep, 227; *F. pratensis*, 228; *F. rubra*, 227; *F. sylvatica*, 228; *F. uniglumis*, 227
- Feverfew, Dan. *feber-urt* = *scutellaria galericul.*, 515, 516
- Fibrils, 6; and Fibrine, 39
- Ficifolium, fig-leaved, fr. Lat. *ficus*, fig, and *folium*, leaf.
- Figwort, 438, 445, 446
- Filago, fr. *filum*, a thread, in allusion to the cottony fluey covering of the plants, 519; *F. apiculata*, 520; *F. gallica*, 520; *F. germanica*, 519; *F. minima*, 520; *F. spatulata*, 520
- Filament, fr. Lat. *filum*, a thread.
- Filices, fr. *filix*, a fern, "urenda filix," fr. *filum*, a thread, the roots being fibrous, 78, 88, 173
- Filiformis, e, fr. *filum*, a thread, and *forma*, form, thread-like.
- Finkle = Fennel, q. v., 593
- Fir, 333
- Fir-rape, 736
- Fistulosa, tubular, fr. Lat. *fistula*, a pipe, Scot. *a whistle*, Aberdonice, *a fusale*.
- Flabellatus, a, um, fr. *flabellum*, a fan, fan-shaped.
- Flavus, a, um, Lat. yellow, and *flavescens*, yellowish.
- Flav cornis, fr. Lat. *flavus*, yellow, and *cornu*, a horn, yellow-horned.
- Flax, 755, 657
- Fleabane, 522, 525; Fleawort, 527
- Fleur-de-luce is derived from Louis, a king of France, who used this flower as his crest, emblem or device. It is now corrupted into fleur-de-lis.
- Flexuosus, a, um, fr. Lat. *flexus*, bent, flexuous or bent.
- Fluxweed, 701

- Fluellin, 450
 Fluitans, fr. *fluere*, to flow or float.
 Fluvialis, e, fr. Lat. *fluvius*, a river, growing in the water.
 Foal-foot, *Folle-fod*, Tussilago, 398, 530
 Foetidus, a, um, stinking, and Foetidissimus, a, um, very stinking.
 Feniculum, fr. *fenum*, hay, to the smell of which the Fennel has some resemblance, 593; F. officinale, 593
 Fontanum, fr. Lat. *fons*, a fountain.
 Fool's-parsley, 589
 Foramen, fr. Lat. *foris*, a door, 29
 Forget-me-not, Dan. *forget-mig-ej*, 467. Forget-me-not is, like the violet of Napoleon, the white and red roses of York and Lancaster, a historical flower. (See Miss Strickland's "History of the Queens of England.")
 Foxglove, 446. Not in Dan. Fl., 1767.
 Fragaria, fr. Lat. *fraga*, strawberries, 10, 625
 "Qui legitis flores et humi nascentia fraga
 Frigidus ob pueri! fugite hinc latet anguis in herba."—Virg. Ec. iii. 92.
 "Mollia traga leges."—Ovid.
 Fr. *fraise* (the root is probably Celtic), so called in French because of its fresh, cooling quality, It. *fresco*, fresh, Mod. Gr. *φραουλι*. F. elatior, 626; F. vesca, 626
 Fragilis, e, fr. Lat. *frango*, I break, what is easily broken.
 Frangula, Lat. *frango* (?).
 Frankenia and Frankeniaceæ, fr. *Franken*, a Swedish botanist, 776; F. lævis, 776; F. pulverulenta, 776
 Fraxinus, fr. *φρασσω*, I hedge round, 485; F. excelsior, fr. *excelsus*, lofty, 486
 French willow-erb, 608
 Fresh-water plants, 75
 Friar's crown, a kind of thistle.
 Fritillaria, fr. Lat. *fritillus*, a dice-box, which the flowers of this genus are fancied to resemble, 297; E. Meleāgris, a poetic name, Meleager's Garland, a selection of poetic short pieces of great merit from the Greek anthology, 297
 Frog's-lettuce is Potamogeton, 283
 Frond, fr. Lat. *frons*, a green bough.
 Fruticosus, a, um, and frutescens, shrubby, fr. Lat. *frutex*, a shrub.
 Fucifera, fr. Lat. *fucus*, a drone, and *fero*, I bear.
 Fuller's-weed is Teasel, which tuckers use.
 Fullonum, of fullers, fr. Lat. *fullo*, a fuller.
 Fulvus, a, um, adj. tawny.
 Fumaria, 721, and Fumariaceæ, 33, 84, 719, 720, 721, fr. *fumus*, smoke, it has a smoky smell; F. *agraria*, 722; F. capreolata, fr. *caper*, a goat, because it climbs, 721; F. micrantha, fr. *μικρος*, small, and *ανθος*, a flower, 721; F. officinalis, 721; F. paviflora, 721; F. Vaillantii, in honour of Vaillant, 722
 Fungi, fr. *fungus*, a mushroom, 115, 154
 Funiculus, a little cord, fr. Lat. *funis*, a cord, 27, 29
 Funnel-shaped, 24
 Furze, 54, 660
 Fuscus, tawny.
 Gagea, a name dedicated to Sir T. Gage, a famous Suffolk botanist, 300; G. lutea, 300
 Gale, or Goule, or Sweet Willow, or Dutch Myrtle, fr. Cel. *gal* and *galb*, unctuous matter, *gaul* in Gaelic, 357
 Galanthus, fr. *γαλα*, milk, and *ανθος*, flower, 325; G. nivalis, 326
 Galeopsis, fr. *γαλεη*, and *οψις*, face, appearance, likeness, 424; G. Ladanum, name of an Eastern gum, obtained fr. a shrub called lada, 430; G. ochroleuca, 430; G. Tetrahit, fr. *τεταρτος*, four-angled, 430; G. versicolor, 430.
 Galium, fr. *γαλα*, milk, rennet-plants, 560; G. anglicum, 562; G. Aparine, fr. *απαρω*, I lay hold, as the fruit and whole plant does, 563; G. aristatum, 561; G. boreale, 563; G. cinereum, 561; G. commutatum, 561; G. cruciatum, 560; G. erectum, 560; G. Mollugo, fr. *mollis* and *ago*, a termination signifying the same as *οιδες*, 560; G. montanum, 561; G. palustre, 561; G. pusillum, 561; G. saccharatum, 562; G. saxatile, 561; G. spurium, 563; G. tricorne, 562; G. uliginosum, 562; G. Vaillantii, 563; G. verum, 560
 Garden archangel, 595
 Gasteromycetes, a tribe of fungi, fr. *γαστρον*, a stomach, and *μυκος*, a fungus, 156
 Gastridium, fr. *γαστρον* and *γαστριδιον*, a swelling on the glume, 210; G. lendigerum, fr. Lat. *lens*, gen. *lendis*, a nit, and *gerit*, bears, 210
 Geniculatus, adj., bent, fr. *genu*, a knee.
 Genista, fr. Cel. *gen*, a shrub, 659; G. anglica, 659; G. pilosa, 659; G. tinctoria, 659
 Gentian, vernal, 50, 478, 481, 482
 Gentiana and Gentianaceæ, named fr. Gentius, a royal herbalist, 478; G. acaulis, 481; G. Amarilla, fr. Lat. *amarus*, bitter, 482; G. campestris, 482; G. nivalis, 482; G. Pneumonanthe, fr. *πνευμα*, wind, and *ανθος*, flower, 482; G. verna, 581
 Gentianella, Dan. *enzian*, 483
 Geaster, a genus of fungi, name fr. *γεια* or *γη*, earth, and *αστρον*, a star, star of the earth, in allusion to the radiate form of that part which bears the pileus, 156
 Gemmiparus, a, um, fr. Lat. *gemma*, a bud, and *parit*, it produces.
 Gentils, e, of the same race (?).
 Geraniaceæ and Geranium, fr. *γερανιος*, a crane, in allusion to the beaked carpels, 21, 25, 33, 55, 747, 748; G. columbinum, fr. Lat. *columba*, a pigeon, 749; G. dissectum, 749; G. lucidum, 751; G. molle, 750; G. nodosum, 748; G. phæum, 748; G. pratense, 748; G. purpureum, 751; G. pusillum, 750; G. pyrenaicum, 750; G. robertianum, 751; G. rotundifolium, 751; G. sanguineum, 749; G. striatum, 751; G. sylvaticum, 749
 Geum, a name applied to some savoury

- plant, fr. γεῦω, I taste, hence *gustare* and *gusto*, 639; *G. intermedium*, 639; *G. rivale*, 639; *G. urbanum*, 639
- Githago, fr. *gith* or *git*, and *ago*, I am like.
- Gibbus, a, um, Lat., having a swelling or protuberance.
- Gipsywort, Dan. *vand-marru*, water-mar-rubium, 421
- Glabr, glabra, glabrum, smooth, and glaberrimus, a, um, very smooth.
- Glards, 4, 5
- Glandulosus, a, um, Glandulose, glandular, bearing glands.
- Glasswort, 392
- Glaucium, fr. Lat. *glaucus*, sea-green, the colour of the leaves, 725; *G. luteum*, 725; *G. phœnicium*, 725
- Glaux, fr. γλαῦξ, owl, a name given to a plant having the colour of the owl's eyes, or fr. Lat. *glaucus*, and *glaucius*, sea-green, 410; *G. maritima*, 410
- Glechōma, fr. γλῆχων, a sort of thyme, 426; *G. hederacea*, 426. * * * "περὶν ὁδὴ πατρῆς καὶ γλαχῶν ἀνθεύσαν," Theoc. v. 56
- Globe-flower, 788
- Glomeratus, fr. Lat. *glomus*, a clew or round cluster.
- Glume, Glumelle, Glumellule, dims., fr. *gluma*, 192
- Glyceria, fr. γλυκύς, sweet, 222. Some of these species yield a viscid, sweet exudation. *G. aquatica*, 223; *G. fluitans*, 222; *G. plicata*, 222
- Gnaphalium, fr. γναφαλον, down, 520; *G. dioicum* (see *Antennaria*), 521, 522; *G. luteo-album*, 521; *G. rectum*, 521; *G. supinum*, 521; *G. sylvaticum* (see *Appendix*); *G. uliginosum*, 521
- Goat's-foot, 585; Goat's-beard, 52, 537
- Gold of plasure, an absurd name, 710
- Goldilocks, 526
- Golden rod, 524
- Golden Saxifrage, 574
- Good Henry, or King Henry, 387
- Goodyera, named in honour of John Good- yer, a Hampshire botanist, and correspondent of Gerard, 321; *G. repens*, 321
- Gooseberry, 571, 572; Goose-corn, Goose-grass, 561, 562; Goose-foot, 48, 383, 384, 386, 387; Goose-tansy is *P. anserina*, 625; Goose-tongue is *Achillea Ptarmica*, 513
- Gorse, 54, 659
- Gout-weed, Fr. *boucage*, Ger. *geissfuss*, should be Goat-weed, 584, 585
- Gowans, Horse-gowans (Daisy and Horse-daisy), 517
- Grain-bearing plants, &c., 99, 105
- Gracilis, e, slender, weak, tender.
- Gramineæ, 19, 39, 85, 88, 90, 129, 130
- Grandiflorus, a, um, large-flowered, fr. Lat. *grandis*, great, and *flos*, flower.
- Granulatus, a, um, granulate, bearing grains or tubercles.
- Granules, fr. Lat. *grana*, small grains, 1
- Grass, couch, panic, 7
- Graveolens, fr. Lat. *gravis*, strong, and *oleo*, I smell.
- Great snapdragon, 71
- Greek Valerian, 477
- Gristlewort, 654
- Gromwell, Graymil, 50, 469; 470
- Grossulariaceæ, *grossus*, a green fig, and *grossula* and *grossularia*, a berry, 24, 571
- Ground ivy, 426
- Groundsel, common, A. S. *grundeswylige*, Grunny-swally, 51, 527
- Guelder rose, Dan. *fugle-baer* and *vand-hyld*, 564, 565
- Guile, Dan. *onde-urter*, the bad weed, 517
- Guttatus, a, um, fr. Lat. *gutta*, a drop, spotted.
- Gymnadenia, fr. γυμνος, visible, uncovered, and *αἶνν*, a gland, 317; *G. albida*, 317; *G. conopsea* (by antiphrasis?), fr. κωνοψ, a canopy, because the glands are naked (?).
- Gymnogens, fr. γυμνος, naked, and γινεσθαι, to be, 332
- Gymnogramma, fr. γυμνος, naked, and γραμμ, a line, naked lines of spore cases, 176; *G. leptophylla*, fr. λεπτός, slender, and φύλλον, a leaf, 176
- Gyrate, fr. *gyratus*, turned round, like a shepherd's crook, 22
- Habenaria, fr. Lat. *habena*, a rein, 317; *H. bifolia*, 318; *H. chlorantha*, fr. χλωερός, or χλωρος, yellowish-green, 318; *H. viridis*, 317
- Haloragaceæ, fr. αλς αλος, an order of aquatics, and ραξ, a bunch of grapes, 606
- Hare's-ear, Dan. *gienem-væxt* (thorow-wax), 582, 583
- Hartwort, 598
- Ha-tatus, a, um, and Hastulatus, a, um, fr. *hasta*, a spear, and *hastula*, a little spear, to which some resemblance is borne by some part of the plants so named.
- Haslewort, asarabacara, Dan. *hassel*, hazel or hazel, 351, 354
- Hawk's-beard (Hawk-lung), 540; Hawk-weed, Dan. *høgsurt*, 542, 552
- Hawthorn, *hagedorn*, Dan. *hage-torn*, 613
- Hedera = Hiedra or Heath, Scot. *heather*, fr. heat, because it was, and is, used for fuel, 50. Hedera = Eygloff. Verbena ysern-wort. Hederick = Album mel., i.e., Album liliolum, Westph. Gloss. *H. Helix*, fr. ελίσσω, I bind around, 569
- Hederaceæ, a, um, fr. Lat. *hedera*, ivy, ivy-like.
- Hedge-parsley, Dan. *vild-kørvel*, 600, 601
- Hedysarææ, fr. ἡδυσαρων, sweet pulse, or clover, 682
- Helianthemum, fr. ἥλιος, the sun, and ἄνθος, a flower, 689; *H. canum*, 691; *H. guttatum*, 690; *H. ledifolium* (ledum-leaved), 691; *H. polifolium*, fr. Lat. *polio*, I smooth, 690; *H. vulgare*, 689
- Helioscopia, fr. ἥλιος, the sun, and σκοπεω, I regard.
- Hellebore, Ger. *neisswurz*, 788
- Helleborine, 322, 324
- Helleborus, fr. ελεῖν, to injure, and βορα, food, a poisonous plant, 788; *H. foetidus*, 789; *H. viridis*, 101, 789

- Helminthia*, *ελμινθος* a worm, and *θηκη*, a case, which the seeds were fancied to resemble, 536; *H. echinoides*, 536
- Heleocharis*, fr. *έλεος*, marsh, and *χαίρω*, I love, because these plants delight in watery places, 258. The name is sometimes written *Eleocharis*. The initial in the original is aspirated thus, *ύμεν*, hymen. *H. acicularis*, 260; *H. multicaulis*, 259; *H. palustris*, 259; *H. uniglumis*, 259; *H. Watsoni*, 259
- Helosciadium*, fr. *έλος* and *σκιαδειον* (*σκια*), a shadow, grows in shady, wet places, or its umbel casts a shadow, 536; *H. inundatum*, 587; *H. nodiflorum*, 586; *H. repens*, 587
- Helosciadium*, *corrigé* into *Helosciadium*, 377
- Helvella*, the Lat. name of some fungus not ascertained.
- Hemlock, the Danes call it *skarntyde*, a villainous plant, 604; *hymelic* (*Cicuta virosa*), 584
- Hemp, 369, 370; Hemp-nettle, 429, 430
- Henbane, Dan. *sœe-bonne* (hog-bean), destructive to poultry, 49, 462, 463
- Henbit is dead-nettle, 428
- Hepaticæ*, fr. *ήπαρ*, the liver, in allusion to the shape or the colour of some of the species, 115, 118, 160
- Heraclium*, fr. *Hercules*, a great botanist and warrior, 597; *H. Sphondylium*, fr. *σφονδυλη*, a beetle; the smell of the plant resembles that of beetles, 597
- Herb Bennett, 639
- Herb Christopher, 791
- Herb Gerrard, 639; Herb Paris, 308
- Herba perforata*, *santa Johannes-wort*, ancient glossary, 731
- Herbaceous*, fr. *herba*, applied to stems which die annually, opposed to arboreous, fruticose, &c.
- Herminium* (*Ophrys monorchis* of old botanical authors), fr. *Hermione*, the daughter of Helen (?), *pulchriori matre filia*, 319; *H. monorchis*, 319
- Herniaria*, fr. *hernia*, a rupture, for which it was a reputed remedy, 653; *H. ciliata*, 653; *H. glabra*, 653; *H. hirsuta*, 653
- Hesperis*, fr. *ήσπερις*, the evening, when the flowers give out a fragrant smell. *H. matronalis*, fr. *mater*, lady, Our Lady, 699
- Heterophyllus*, a, um, fr. *ήτερος*, other, and *φύλλον*, a leaf, varying in its foliage.
- Hexandrus*, a, um, fr. *έξ*, six, and *αυεφ*, gen. *ανδρος*, a stamen, having six stamens.
- Hiberna*, winter quarters.
- Hieracium*, fr. *ήραξ*, a hawk, universally believed to have been used by hawks, and other birds of prey, to strengthen their sight, hence Hawkweed, *Eperviere*, *Habicht's-kraut*, *Höf's-urt*, &c. *H. alpinum*, 543; *H. angicum*, 546; *H. aggregatum*, 547; *H. amplexicaule*, 546; *H. argenteum*, 547; *H. auranticum*, 543; *H. boreale*, 551; *H. calenduliflorum*, 544; *H. cerinthoides*, 545; *H. chrysanthum*, 545; *H. crocatum*, 550; *H. corymbosum*, 551; *H. cæsius*, 548; *H. eximium*, 544;
- H. floculosum*, L. C.; *H. Gibsoni*, 547; *H. globosum*, 544; *H. gothicum*, 549; *H. gracilentum*, 544; *H. holosericeum*, 544; *H. iricum*, 546; *H. lasiophyllum*, 547; *H. lingulatum*, 545; *H. marorum*, 547; *H. nigrescens*, 544; *H. nitidum*, 547; *H. pallidum*, 546; *H. Pilosella*, 543; *H. prenanthoides*, 550; *H. rigidum*, 551; *H. sabaudum*, 551; *H. senescens*, 545; *H. stelligerum*, 548; *H. strictum*, 550; *H. tridentatum*, 549; *H. umbellatum*, 550; *H. vulgatum*, 548
- Hierochæ*, fr. *ήερος*, sacred, and *χλση*, a grass, holy grass, because anciently used to strew on the floors of churches, 197; *H. bor-alis*, 197
- Hippocrepis*, fr. *ήππος*, a horse, and *κρηπις*, a shoe, 683; *H. comosa*, 683
- Hippophaë*, fr. *ήππος*, a horse, and *φω*, I cause to shine or glisten. The ancient name of some unknown plant given to horses to make them sleek. *H. rhamnoides*, like a rhamnus, 358
- Hippuridaceæ* and *Hippuris*, fr. *ήππος*, a horse, and *ουρα*, a tail, 396; *H. vulgaris*, 396. *Correct Hippurus*, p. 94
- Hirtus*, a, um, contraction for *Hirsutus*, a, um, rough, shaggy, hairy.
- Hispidus*, a, um, hispid, having stiff hairs.
- Holoschenus*, fr. *όλος*, whole, and *σχοινος*, a rush.
- Holosericeus*, a, um, fr. *όλος*, all, and *sericeus*, silky.
- Hog-nut corrupted into hawk-nut, or hawk-nut degenerated into hog-nut. The Danish name of hawk is *høg*, pronounced almost exactly like hawk (kipper-nut), 588: *Hox-weed*, Ger. *heil-kraut* (healing-wort), 597
- Holcus*, fr. *όλκος* and *ελκω*, I draw, a name given to a plant that had the property of drawing thorns from the flesh, 207; *H. lanatus*, 207; *H. mollis*, 207
- Holly, a corruption of holy tree, used for decorating churches at Christmas-tide (?), 48, 50, 486—
- "The holly pointing to the moorland storm
- Its hardy, fearless leaf."
- Holostea*, fr. *όλος* and *οστέα*, by antiphrasis, so called because there is nothing hard or bony in any part of the plant, 772
- Holosteum* (see *Holostea*), 771; *H. umbellatum*, 102, 771
- Honckenya*, in honour of G. A. Honkenya, a famous cultivator, 770; *H. peplodes*, 771
- Honewort, 584
- Honeysuckle, 564, 566
- Hooded millet, 414
- Hop, Dan. *humle*, 369
- Hordeiformis*, e, fr. *hordeum*, and *forma*, barley-like.
- Hordium*, *horreo*, I bristle (*horda*). *H. maritimum*, 236; *H. murinum*, 236; *H. pratense*, 236; *H. sylvaticum*, 236; *H. vulgare*, 237
- Horehound*, Dan. *marrube*, black, 432
- Horizontal area, &c., of British plants, 86

Hornbeam, 354

Hornwort, 52, 372

Horse-bane (*Phellandrium aquaticum*, *Cenanthe Phell.*), 591. The application of the terms *horse*, *dog*, &c., to plants, teaches us that our ancestors had more imagination than invention, or were more poetical than their posterity. They perceived resemblances where the relations, affinities, and analogies were very remote. Horse-daisy or gowan is a bad weed in hay-fields, and Horse-knops is worse than worthless in pastures. Horse-mint is not popular in the kitchen. *Horse* was also applied to something great as well as worthless, e.g., Horse-chestnut, Horse-radish, Horse-leech, &c.; Horse-bean, the common field bean; Horse-beech, probably a corruption of horn-beech, which again is probably a corruption of horn-beam (*Carpinus Betulus*); Horse-foot, Dan. *heste-hov*, or Colt's-foot, *Tussilago*, an example of a foreign word becoming naturalized, better understood, and more familiar than the genuine Anglo-Saxon name, 530; Horse-gowan, 517; Horse-heal, *Elecampane*; Horse-knobs or Knap-weed, *Centaurea nigra*, 508; Horse-mint, Dan. *heste-mynthe*, 418; Horse-parsley, *Hipposelinum*, 605; Horse-radish; Horse-shoe, 54, 683; Horse-tail, Dan. *heste-rumpe*, 81

Hottonia, so called in honour of Peter Hotton, a famous Dutch botanist, author of some works on medicinal plants, 406; H. palustris, 407

Hound's-tongue, *Cynoglossa*, West. Glos. *hundes-tunge*, 50, 471, 472

House-leek, Dan. *huus-løg*, West. Glos. *hus-loec*, 102, 647, 648, 651. *Barba Jovis*, Jupiter's beard, is a common name of this plant in the mediæval glossaries. In the mythology of the northern nations Jupiter supplanted Thor, to whom this plant was probably dedicated. Hence it is not of very modern introduction, as some botanists imagine, because it grows on walls.

How, Wm., 96

Hudson's Flora Anglica, 97

Humifusa, us, um, fr. *humus*, ground, and *fundere*, to spread over, a term expressive of the prostrate habit of some plants.

Humulus, fr. *humus*, ground, 369; H. Lupulus, a dim. fr. *lupus*, 369

Hutchinsia, in honour of Miss Hutchins, a famous Irish cryptogamist, 813; H. petrea, 713

Hyacinth grape, 303; Hyacinth wood, 301; Hyacinth ancient—

"Ipse suos gemitus foliis inscribit et ai ai."—Ovid, *Metam.* x. 215.

"The sanguine flower inscribed with woe (ai)."

Hybridus, a, um, hybrid.

Hydrocharidaceæ and Hydrôchæris, fr. *υδωρ*, water, and *χαίρω*, I love; H. Morseranæ, 33, 810

Hydrocôyle, fr. *υδωρ*, water, and *κοτυλη*, a cup or hollow, 11, 579; H. vulgaris, 530

Hydrolapathum, fr. *υδωρ*, water, and *λαπαθον*, surrel or dock.

Hydrôpiper, fr. *υδωρ*, water, and *piper*, pepper, a word which etymologists call a barbarism, a hybrid production of two languages, or rather of one who ignorantly or wilfully broke Priscian's head.

Hymenophyllum, fr. *ὑμηρ*, a membrane, and *φυλλον*, a leaf, 188; H. Tunbridgensæ, fr. Tunbridge, Sussex, where this species grows, 183; H. unilaterale, fr. *unus*, one, and *latus*, side, the pinnæ being one-sided (unilateral).

Hypocoum, fr. *υπηχω*, I sound. The seeds make a noise in the capsule. H. procumbens, 726

Hyoseyamus, fr. *jusquiamus*, fr. *vos*, sow, and *κυαμος*, bean, 462; H. niger, 468

Hypoglotis, fr. *υπο*, under, and *γλωσσα*, or *γλωττα*, the tongue, like the muscle under the tongue. Epiglottis has the same meaning.

Hypericaceæ and Hypericum, fr. *υπο* and *ερεικα*, and hence the penult is long, or should have the accent, *υπερ εικων*, *super imago*, 33, 730; H. Androsæum, 733; H. anglicum, 733; H. calycinum, 733; H. dubium, 731; H. elodes, *rectius heleodes*, fr. *ελος*, a marsh, where this species grows, 734; H. hircinum, 733; H. hirsutum, 733; H. humifusum, 55, 732; H. linariæfolium, fr. *linaria* and *folium*, 732; H. montanum, 733; H. perforatum, 731; H. pulchrum, 55, 732; H. quadrangulum, 731

Hypochæris, fr. *υπο*, under (for), and *χαίρω*, a hog, 533; H. glabra, 534; H. maculata, 534; H. radicata, 533

Hypogynous, fr. *υπο*, under, and *γυνη*, the organ of fructification, 26

Iberis, fr. *Iberia* (Spain), where these plants abound, 713; I. amara, 713

Ilex, a name given by Pliny to some plant, 487; I. Aquifolium, 487

Illecëbraceæ, 652, and Illecëbrum, 654, fr. Lat. *illecëbra*, by antiphrasis; the plants have no attractive qualities; I. verticillatum, 654

Imbricate, or imbricated, fr. *imber*, a shower, by metonymy, the cause put for the effect; tiled.

Impatiens, Lat. (impatient), the seeds leap from their capsule, 753; I. fulva, 113, 753; I. Noli-me-tangere, a touchy object, a Timothy Testy among plants, 753; I. parviflora, 753

Indusium, fr. *induo*, I put on; a cover of the clusters of spore-cases.

Inflorescence, *in*, and *flos*, a flower, 28; centrifugal, 21; centripetal, 21; definite, 21; indefinite, 20

Introduced plants, 111

Inula, fr. *ΕΑερη*, Helen (?), 523; I. Conyza, 523, *κνύζα*, Erigeron graveolens, Lat. Schol. in Theoc. iv. 25; I. crithmoides, 523; I. Hellenium, 523

Incanus, a, um, hoary.

Incisus, a, um, cut or cleft.

- Incurvus*, a, um, curved inwards.
Indehiscent, not opening, 31
Infestus, a, um, troublesome.
Innatus, a, um, growing on.
Inodorus, a, um, without smell.
Insectiferus, a, um, insect-bearing.
Intermedius, a, um, intermediate.
Interruptus, a, um, adj., interrupted.
Involutus, a, um, and *Involute*, fr. *in*, and *volveo*, I roll, rolled inwards, 18
Involucre, fr. Lat. *involveo*, I embrace, a series of bracts subtending several flowers, 22
Iridacæ and *Iris*, a poetic-mythic name, 327, 329; *I. fœtidissima*, 330; *I. Pseudo-acorus*, 329
Irriguum, a, us, fr. *in*, and *rigo*, I water "Rura mihi et rigui placeant in vallibus amnes"—Growing in splashy or wet places.
Isatis, *ισατις*, fr. *ισαζω*, I make equal, supposed to have the effect of smoothing the skin, 717; *I. tinctoria*, 717
Isnardia, in honour of D'Isnard, a celebrated French botanist; *I. palustris*, 611
Isoetes and *Isoetes*, fr. *isos*, equal, and *eros*, year, *i. e.*, evergreen, 164; *I. lacustris*, fr. *lacus*, lake, 164
Ivy, Dan. *ved-bende* (winding about), 569
Jack-by-the-Hedge, Dan. *hvid-løgs-urt* (leek-wort), 56, 700
Jacob's ladder, 477, 478
Jasione, fr. *ιασων*, *ιασμαι*, I heal, or fr. *ιων*, a violet, 499; *J. montana*, 499
Juncaceæ and *Juncus*, name fr. *jungo*, I join, some species being used, and still are used, for traces and other drawing-gear, 266, 267; *J. acutiflorus*, 271; *J. acutus*, 269; *J. balticus*; 268; *J. biglumis*, 279; *J. bufonius*, fr. *bufo*, a toad, 270; *J. capitatus*, 271; *J. castaneus*, chestnut-like, 270; *J. coenosus*, 269; *J. compressus*, 269; *J. conglomeratus*, 268; *J. diffusus*, 267; *J. effusus*, 267; *J. filiformis*, 268; *J. glaucus*, 268; *J. lamprocarpus*, fr. *λαμπος*, shining, and *καρπος*, fruit, 272; *J. maritimus*, 268; *J. obtusiflorus*, 271; *J. squarrosus*, 269; *J. tenuis*, 270, 272; *J. trifidus*, 271; *J. triglumis*, 270; *J. uliginosus*, 272
Juncaginaceæ, fr. *Juncus*, and *ago*, like, 289
Jungermannia and *Jungermanniaceæ*, named in honour of L. Jungermann, a German botanist, 161
Juniper, 334
Juniperus, fr. Cel. *jenepurus*, rough, 334; *J. communis*, 334
Kipper-nut, 588
Knapparts, or *gnapparts*, is heath-pea, 680
Knappia, fr. Mr. Knapp, a celebrated author on British grasses; *K. agrostidea*, 201
Knautia, in honour of C. Knautius, 554; *K. arvensis*, 554
Knot-grass, 377, 652
Knoutberry, or *Knoupberry*, or *Cloudberry*, 637
Koeleria, name in honour of J. L. C. Koelle, a German botanist, 211; *K. cristata*, 211
Korn rose = *Papaver Rhœas*, 723
Königa, fr. Mr. König, who, with Mr. Sims, was conductor for some time of the "Bot. Mag.," 707; *K. maritima*, 707
Labiata, name fr. Lat. *labium*, a lip, 23, 39, 89, 110, 129
Lactuca, fr. Lat. *lac*, milk (Pliny), milky plants, 537; *L. muralis*, 538; *L. saligna*, so called fr. the withy-like stems (?), 538; *L. scariola* (*scarriola*?), fr. Lat. *scurreo*, I am rough, 531; *L. virosa*, 538
Lacinatus, a, um, having deep incisions, or long and narrow lobes.
Lacustris, e, growing in water, fr. *lacus*, a lake.
Lady's bed-straw, Our Lady, the Virgin Mary, 560; *Lady's finger*, Dan. *katt-klever* (cat-clover), 661; *Lady's seal*, Dan. *kunde-bær* (dog-berry), 331; *Lady's slipper*, 324; *Lady's tresses*, 321; *Lady's* or *Dame's* violet, 699; *Lady's mantle*, Dan. *love-fod* (lion's-foot, 464, 645; *Lady's smock*, Dan. *enge-kers* (meadow-cress), 697
Lævigatus, a, um, fr. *lævis*, polished.
Lagurus, fr. *λαγως*, a hare, and *ουρα*, a tail, hare's-tail, 207; *L. ovatus*, 207
Lamb's-lettuce, Dan. *felt-krop* (corn-salad), 557
Laminaria, fr. *lamina*, thin scales, a blade; so called from the tenuity of their fronds, 154
Lamioides, 426; and *Lamium*, fr. *λαμνος*, throat; 427; *L. album*, 428; *L. amplexicaule*, 48, 49, 427; *L. Galeobdolon*, fr. *γαλεν*, a weasel, and *βόλος*, fœtor, *nauseosa*, quæ nescio quod insueti produnt (Linn. Ph. Bot. 129), 49, 429; *L. incisum*, 428; *L. intermedium*, 428; *L. maculatum*, 429; *L. purpureum*, 48, 428
Lanceolate, narrow, long, and tapering like a lance, 12
Lappa, fr. *λαβειν*, to adhere to, "sticks like a bur," or fr. Cel. *lapp*, a hand, or *lap* = *coagulare*, lapped milk is milk coagulated.
Lapsana, or *Lapsana*, fr. *λαπτω*, I suck; "lapsanâ vivere," to fare badly, 531; *L. communis*, 531
Larkspur, 790. It has a more dignified name in German and Danish, viz., *ritter* and *ridder-spore*, or knight's-spur.
Laserpitie, fr. *laser*, a gum, and *serpit*, roots yielding gum, 508
Lastrea, named in honour of D'Lastre, a zealous French botanist, 176; *L. æmula*, fr. *æmulus*, a rival, 179; *L. cristata*, 177; *L. dilatata*, fr. *dilato*, 178; *L. Filix-mas*, 177; *L. Oreopteris*, fr. *opos*, mountain, and *πτερις*, fern, growing in open places, 179; *L. rigida*, 177; *L. Thelypteris*, *θελυς*, female, and *πτερις*, a fern, 179
Lathyrus, fr. *λαθυρος*, Theophrastus, 54, 679; *L. Aphaca*, fr. *αφακη* (and *φακος*), not a lentil, not eatable, 682; *L. hirsu-*

- tus, 631; *L. latifolius*, 680; *L. macrorhizus*, 680; *L. maritimus*, 681; *L. niger*, 680; *L. Nissolia*, 682; *L. palustris*, 681; *L. pratensis*, 679; *L. sylvestris*, 680
- Lavatæa, in honour of the celebrated Lavater, 746; *L. arborea*, 746; *L. cretica*, 747; *L. olbia*, 747; *L. punctata*, 747
- Lavender, 404
- Laver, or porphyra, 154
- Leadwort order, 402
- Lecanodia, fr. *λεκανιον*, a small shield, in allusion to the shape and consistency of the fructification; a genus of Lichens, remarkable for their coloring properties.
- Lantana, fr. Lat. (dog-latin), *lento*, I make pliant, fr. *lentus*, pliant, tough.
- Lathræa, fr. *λαθραιος*, concealed, as these plants are by the dead leaves, 457; *L. squamaria*, 457
- Leek, A. S. *leac*, Dan. *løg*, 301, 303
- Leaves, compound, when composed of more than one distinct piece, 15; simple, when they consist of one piece, 12
- Leersia, name fr. J. D. Leers, 202; *L. oryzoides*, 202
- Leguminiferæ, fr. *legumen*, a legume, and *fero*, I bear, 19, 23, 26, 29, 39, 54, 81, 89, 90, 657
- Lemna and Lemnaceæ, fr. *λεπτις*, a scale (?), 280; *L. gibba*, 281; *L. minor*, 281; *L. polyrrhiza*, 281; *L. trisulca*, three-furrowed, 281
- Leontodon, fr. *λεων*, lion, and *οδους*, tooth, 535; *L. Taraxacum*, fr. *ταραξω*, I will move, in allusion to the apert properties of the root, 535
- Leonurus, fr. *λεων*, lion, and *ουρα*, a tail, 433; *L. Cardiaca*, fr. *cor*, heart, hence *cardiacus*, a cordial, 434
- Leopard's-bane, 526
- Lepidium, fr. *λεπτις*, a scale, which the little pouches resemble, 714; *L. campestre*, 714; *L. draba*, 714; *L. graminifolium*, 715; *L. latifolium*, 715; *L. ruderaie*, 715; *L. Smithii*, 714; *L. sativum*, 715
- Lepigonum, fr. *λεπτις*, a scale, and *γωνη*, an angle, 766; *L. marinum*, 767; *L. medium*, 767; *L. rubrum*, 766; *L. rupestre*, 767
- Lepturus, fr. *λεπτος*, slender, and *ουρα*, a tail, in allusion to the taper slender spikes, 238; *L. incurvatus*, 235
- Lettuce, Dan. *laktuk* (lactuca), 537, 538
- Libanotis, fr. *λιβανωτις*, the Greek name of an odoriferous umbellifer, 592; *L. montana*, 592
- Lichens, Lichenes, or Lichen, 158
- Ligusticum, fr. *Liguria*, where these plants grow (see Pliny, book xix. ch. 50), 592; *L. scoticum*, 593
- Lentibulaceæ, named from the lenticular air-bladders, 412
- Lent-lily, Dan. *paaske-lilie*.
- Leucocjum, fr. *λευκοιον*, white violet, 326; *L. æstivum*, 326
- Ligule, fr. *ligula*, a little band, 18, 191
- Ligustrum, fr. Lat. *ligo*, I bind, 436; *L. vulgare*, 486. "*Alba ligustra cadunt*."
- Liliacæ, 295
- Lily, fr. Cel. *lis*, whiteness.
- Lily of the vale, Dan. *lilietjes van den dale* (lily conv.)
- Lily, water, 726, 727
- Limosa, fr. Lat. *limus*, mud.
- Limosella, fr. Lat. *limus*, mud, 444; *L. aquatica*, 445
- Linum and Linaceæ, 755, 756, fr. *λινον*, a fibre or thread, C. B. *lin*, a fibre, an example of the name of the plant derived from its economical uses, 755, 756; *L. angustifolium*, 756; *L. catharticum*, 757; *L. perenne*, 756; *L. usitatissimum*; 756
- Linaria, fr. *linum*, flax, to which the leaves of some bear a resemblance, 71, 447. The terminations *aria*, *aster*, *astrum*, *ago*, &c., mean likeness. *L. Cymbalaria*, fr. *cymbalaris*, "an herb that groweth in mud walls, with a leaf in fashion like ivy, but much less, and a little purple flower" (Cooper's Thes. 1584), 449. This reputed alien has been dwelling here three centuries at least. *L. elätine*, 450; *L. italica*, 449; *L. minor*, 449; *L. pelis-seriana*, 448; *L. repens*, 448; *L. spuria*, 449; *L. supina*, 448; *L. vulgaris*, 448
- Linden, or Lime, 742, 743, fr. A. S. *lind* or *lin*, flax fibre, because the inner bark is fibrous, and is woven into mats.
- Linear, fr. Lat. *linea*, a line, when the leaf is very narrow and long it is linear, 12
- Ling, Dan. *lyng*; ling is a line, Fr. *ligne*, a kind of rush in Scotland. A *lingel* is a shoemaker's thread. In the same country heath is twisted into ropes to secure thatch on cottages, 490
- Linnæa, named in honour of the great Linnæus, 566; *L. borealis*, 566
- Linnæan system, 128
- Lilium, fr. Cel. *lis*, whiteness, 297; *L. Martagon*, 297; *L. pyrenaicum*, 297; *L. candidum*, 289
- Liparis, fr. *λίπας*, or *λίπος*, fat, 312, 313; *L. Loisellii*, 313; *nomen honoris*, J. Lösel, or Loselius, a German botanist, 1650
- Listera, a name commemorative of Dr. Martin Lister, 322; *L. cordata*, fr. *cor*, the heart, 322; *L. ovata*, 322
- Lithospermum, fr. *λίθος*, a stone, and *σπερμα*, seed, which is as hard as a stone, 469; *L. arvense*, 470; *L. maritimum*, 470; *L. officinale*, 470; *L. purpureo-cæruleum*, 470
- Littoralis, e, and littoreus, a, um, fr. Lat. *littus*, the sea-shore.
- Littorella, fr. *littus*, a shore where the species grow, 402; *L. lacustris*, 402
- Lobelia and Lobeliæ (in honour of De Lobel, a distinguished botanist, auct. Stirpium Icones, 1591), 499, 500; *L. Dortmannæ*, Dortmann, a Dutch uruggist and botanist, 500; *L. urens*, 501
- Locker-gowans = Lucken-gowans, fr. *lu-chen*, shut up (lock), in allusion to the folded sepals of this flower, 788
- Lolium, fr. Cel. *loloa*. "*Infelix lolium et steriles dominantur avenæ*," Virg. *L. linicola*, fr. *linum*, flax, and *colo*, I till, grows where flax is cultivated (?), 233; *L.*

- multiflorum, 233; *L. perenne*, 233; *L. temulentum*, 234. "If it be eaten in hoate breade it maketh the head gidie," Coop. Thess.
- London Catalogue, 97
- London Rocket, 699
- Lonicera*, fr. *Lonicer*, a German botanist, who lived in 1582, 566; *L. Caprifolium*, 566; *L. Periclymenum*, fr. *περι*, about, and *κλυμενον*; *L. Xylosteum*, fr. *ξύλον*, wood, and *οστεον*, a bone, wood hard as a bone.
- Loesetrife* and *Loosestrife*, Dan. *fred-log* (lose-peace), *katte-urt*, 408, 409, 656
- Livida*, a, um, with cloudy marks.
- Lloydia*, a name devoted to the memory of H. Lhwyd, a famous Cambrian antiquary, linguist, and botanist, the discoverer of this plant on the mountains of Carnarvon, 298; *L. serotina*, fr. *sero*, late, 298
- Lobatus*, a, um, lobed.
- Longus*, a, um, long, and *Longifolius*, a, um, long-leaved.
- Loranthaceæ*, fr. *lorum*, a thong or bridle, and *αρθος*, a flower, 570
- Lotææ*, 658
- Lotus*, fr. *λωτος*, 662; *L. angustissimus*, 663; *L. corniculatus* (horned), 662; *L. hispidus*, 663; *L. major*, 663; *L. tenuis*, 662
- Lousewort*, Dan. *luus-urt*, 450
- Lovage*, Ger. *liebstock* (lovestick), 592, 593
- Lucidus*, a, um, and *Lucens*, shining, fr. Lat. *lux*, light
- Lungwort*, Dan. *lunge-urt*, 470
- Luzula*, fr. It. *lucciola*, a glow-worm, so called from the shining capsules; *L. arcuata*, fr. *arcus*, a bow, 274; *L. Borreri*, 273; *L. campestris*, 274; *L. Forsteri*, 273; *D. multiflora*, 274; *L. pilosa*, 273; *L. spicata*, 274; *L. sylvatica*, 273
- Lychnis*, fr. *λυχνος*, light, a name given to some plants like these, parts of which served for lamp-wicks, 56, 764; *L. alpina*, 765; *L. diurna*, fr. *diu*, in the day, 764; *L. Flos-cuculi*, cuckoo-flower, because it is in flower when that bird arrives, 57, 764; *L. Githago*, fr. *gith*, which has a seed like a cockle, and *ago*, like; Cockle is *Nigella sativa* (1), 112, 765; *L. vespertina*, fr. *vesper*, the evening, when the flowers open, 764; *L. viscaria*, fr. Lat. *viscum*, birdlime, 765; *L. campion*, 764, 765
- Lycopodiaceæ* and *Lycopodium*, fr. *λυκος*, wolf, and *πους*, claw, 162; *L. clavatum*, fr. *clavis*, a club, hence all the species are named club-mosses, 162; *L. alpinum*, 163; *L. annotinum*, fr. *annotinus*, a, um, *naves annotinae*, ships built the last year, or rather employed in the last year's expedition, fr. *annus*, a year; *L. inundatum*, fr. *inundat*, it overflows; it grows in places that have been overflowed, 163; *L. selaginoides*, Selago-like, 164; *L. Selago*, a name of Pliny's applied to savin-like plants, which some of these species resemble, 163
- Lycopsis*, fr. *λυκος* and *οψις*, resembling a wolf, 465; *L. arvensis*, 466
- Lycopus*, fr. *λυκος*, and *πους*, foot, wolf's-foot, 421; *L. europæus*, 421
- Lyrate*, fr. *lyra*, a lyre, or panduriform, like a violin, 14
- Lysimachia*, fr. *λυω*, I loose, I end, *μοχη*, the strife, 69, 405; *L. nemorum*, 409; *L. nummularia*, fr. *nummulus*, dim., a name for little pieces of money, to which the leaves of this species have some resemblance, 409; *L. thyrsiflora*, fr. *θύρσος*, truss, or cluster, 409; *L. vulgaris*, 408
- Lythraceæ*, and *Lythrum*, fr. *λυθρον* (?), blood, in allusion to the colour of the flowers, 655, 656; *L. hyssopitolum* (*hyssopifolia* in text, *corrigend*), 656; *L. Salicaria*, the leaves resemble those of willows, 656
- Maculatus*, a, um, spotted, fr. *macula*, a spot.
- Madder*, Ger. *farber rothe* (dyer's red), 559, 563
- Madwort*, or German Madwort, is sharpwort, in Ger. *scharfkraut*, and it is believed by some etymologists to be a corruption of A. S. *mæde-wyrt*, meadowwort, 472, 473. In Elfric's glossary *Asperugo* is *herba pratensis*. See Bosworth, in *loco*, 232. Madwort is probably the name given to some worm-expelling plant or vermifuge, from *mad* or *math*, a worm, and *wort*, plant or root.
- Magnus*, a, um, and *Major*, us, and *Maximus*, a, um, great, greater, greatest.
- Maianthemum*, fr. *Maia* and *αρθος*, a flower dedicated to Maia, the daughter of Atlas, or to that other mythological beauty to whom the month May is dedicated, 307; *M. bifolium*, 307
- Maithes*, red, one of T.F. Forster's names, or E. Forster's (?), Warner, Pl. Wood, MS.
- Malachium*, fr. *μαλαχη*, soft; hence *malva* and *mallow*; *M. aquaticum*, 776
- Malcolmia*, named in honour of Mr. Wm. Malcolm, an eminent nurseryman, 693; *M. littorea* and *maritima*, 693
- Mallow*, 13, 743, 746; *M. musk*, 55
- Mallow-marsh*, *Merse-mealwee*.
- Malva* and *Malvaceæ*, a mallow, 33, 55, 70, 743; *M. ambigua*, 745; *M. borealis*, 745; *M. microcarpa*, 745; *M. moschata*, 744; *M. nicaensis*, 745; *M. parviflora*, 745; *M. rotundifolia*, 745; *M. sylvestris*, 744
- Maple*, wild, 55, 738
- Mare's-tail*, 395, 396
- Marigold*, 31, 517; *marsh*, 57, 788
- Marshwort*, 586, 587
- Malaxis*, fr. *μαλασσω*, I soften, 313; *M. paludosa*, 313
- Mariscus*, fr. *μαρισκος*, 263
- Masterwort*, the counterpart of *Imperatoria*, 596
- Marrubium*, fr. Heb. *mara*, bitter, and Cel. *rube*, a general name for root, 432; *M. vulgare*, 433
- Marchantia* and *Marchantiaceæ*, a complimentary term in honour of Marchant, a French botanist, 161

- Maritimus, a, um, and Marinus, a, um, fr. *mare*, the sea.
- Marram, or sea-reed, fr. Dut. *marron*, to linger, tarry, fr. Cel. *mor*, the sea, because this plant grows near the sea, and stops its incursions, hence marsh, moor, muir, &c., 206
- Marsh marigold, 788. The flowers boiled with alum give a good dye to paper.
- Matjoran, Kyning s-wyrt, is King's-wort, 423, 442
- Marsilea and Marsileaceæ, fr. Count L. F. Marsigli, a patron of science, to whom Linnæus dedicated this genus, 164
- Matelion, Knapweed, Dan. *knop-urt*, 509
- Matthiöia, fr. Matthiola, a famous Italian botanist, and editor of *Dioscorides*, who lived in 1550, 693; *M. incana*, 633; *M. sinuata*, 693
- Matricaria, *mater herbarum*, 515
- Matronalis, fr. *mater, madre*, Our Lady.
- Mayweed, Dan. *gaase-urt*, 514
- Meadow-rue, 780, 781
- Meadow-sweet, Dan. *möd-urt*, 620. Meadow-sweet is probably a name given by our Anglo-Saxon ancestors to some plant used with honey in the preparation of metheglin or mead.
- Mecconopsis, fr. *μηκων*, a poppy, and *οψις*, likeness, 725; *M. cambrica* (Wales), where this plant grows, 725
- Medicago, fr. *μηδικη*, Median, 663; *M. ciliaris*, 666; *M. denticulata*, 665; *M. falcata*, 664; *M. lupulina*, 664; *M. maculata*, 664; *M. minima*, 665; *M. orbiculata*, 665; *M. sativa*, 664; *M. scutellata*, 666; *M. sylvestris*, 664; *M. tenoreana*, 666
- Medlar, 613
- Mediok, Dan. *gul-klever*, 664, 666
- Medulary, 36, 37
- Medullary sheath, 8; Medullary rays, 9
- Melampyrum, fr. *μελαν*, black, and *πυρος*, wheat, which the seeds resemble, 451; *M. arvense*, 452; *M. cristatum*, 451; *M. pratense*, 451; *M. sylvaticum*, 452
- Melanthaceæ, fr. *μελας*, black, and *ανθος*, a flower, 294
- Mélica, fr. *mel*, honey, applied to some plant, which had a sweet stem; *M. nutans*, 209; *M. uniflora*, 208
- Meliot, 665, 667
- Meliötus, fr. *mel*, honey, and *Lotus*, 666; *M. arvensis*, 667; *M. messanensis*, 667; *M. coerulescens*, 667; *M. officinalis*, 666; *M. purpurea*, 667; *M. sulcata*, 668; *M. vulgaris*, 666
- Melissa and Mellissinæ, fr. *μελισσα*, a bee, and *mel*, honey, 423, 425; *M. officinalis*, 425
- Meittis, fr. Lat. *mel*, honey, 427; *M. melissophyllum*, fr. *μελισσα*, a bee, 427
- Membranous, thin and partly pellucid; differs from scarious in being thicker and not shrivelled.
- Mentha, fr. Cel. *min*, a lip (?), and *Menthoides*, 417; *M. aquatica*, 419; *M. arvensis*, 420; *M. citrata*, 419; *M. piperita*, 419; *M. pulëgium*, fr. *pulex*, and *ago*, a flea-bane; *M. pratensis*, 418; *M. rotundifolia*, 418; *M. sylvestris*, 418; *M. viridis*, 418
- Menyanthes and Menyanthes, fr. *μην*, a month, and *ανθος*, a flower; flowers during a month (?), or once had the reputation of being a menstrual plant, an *emmenagogue* (?), 479; *M. trifoliata*, 479
- Mercurialis, fr. *Mercurius*, Mercury, who discovered the virtue of this plant, 365; *M. ambigua*, 366; *M. annuus*, 366; *M. perennis*, 366
- Mercury, Dan. *bengel-urt* (bing or bin), 365
- Merulius, supposed fr. *merula*, a black-bird, some of the species being of this colour; a genus of *lungi* (dry-rot); *M. lachrymans*, fr. *lacryma*, a tear, 15. The exudation of this destructive pest is supposed to resemble tears.
- Mesocarp, fr. *μεσος*, middle, and *καρπος*, fruit, 30
- Mespilus, fr. *μεσπιλη*, a Medlar, *μεσος* and *πιλη*, half a ball, which the fruit resembles, 613; *M. germanica*, 613
- Meum, fr. *μηον*, applied by Dioscorides to some umbellifer; *M. athamanticum*, 394
- Mezereon, 359
- Miliseæ and Milium, fr. *mille*, a thousand, or Cel. *mil*, a stone, in allusion to the number or the hardness of its seeds, 193; *M. effusum*, 210
- Milkvetch, Dan. *vild-lakris* (liquorice), 673, 674
- Milkwort, Dan. *kors-blomster* (crosswort), 739, 740
- Miltwort, or Spleenwort, 183, 184
- Mimulus, fr. Lat. *mimo*, I mimic, hence monkey-flower, 454; *M. luteus*, 113, 454
- Minor, us, and Minimus, less, least.
- Mint, Dan. *mynthe*, fr. Lat. *mentha*, famous as an ingredient in mint-julep, one of the many cooling cordial drinks of our transatlantic cousins, 49, 417, 420
- Mistletoe, Dan. *fugle-liim* (bird-lime), 570, 571. *Turdus malum sibi cecat*.
- Moenchia, named in honour of Moench (see Authorities), 773; *M. erecta*, 773
- Molinia, named in honour of G. I. Molina, an Italian botanist; *M. coerulescens*, 225
- Mollis, e, adj., soft.
- Monesis, 736; *M. grandiflora*, 736
- Moneywort, Dan. *penge-blad*, 499
- Monileform, necklace-shaped, fr. Lat. *monile*, a necklace.
- Monkey-flower, 454
- Monk's-hood, 790; Monk's-rhubarb, 382
- Monoccephalous, fr. *μονος*, one, and *κεφαλη*, head, one-headed, 23
- Monochlamydeæ, fr. *μονος*, one, and *χλαμυς*, coat, and Monochlamydeous, 33, 70
- Monœcious, fr. *μονος*, one, and *οικος*, house; plants that have their flowers on more or less distant parts of the same plant; opposed to dioecious and perfect flowers, 20, 22. (See Inflorescence.)
- Monocotylédons, s., and Monocotylédonous, adj., fr. *μονος*, one, and *κοτυληδων*, a seed-

- leaf, 7, 9, 33, 70, 131, 133, 190. The accent is on the *e* and not on the *y*.
- Μονό-ῥνου-, fr. *μονος*, one, and *γυνή*, pistil, organ of fructification, 28
- Μονοπέταλος, fr. *μονος*, one, and *πεταλον*, a leaf (petal), 24
- Μονοσπείριος, fr. *μονος*, and *σπαλος*, a leaf, 62
- Monotropa, and Monotropaceæ, fr. *μονος*, one, and *τρεπω*, I turn, 736. The flowers all turn the same way; a more descriptive term than *secunda*: *M. hypopitys*, fr. *υπο*, under, and *πίτυς*, a pine, where the species grow, 737
- Monspeiensis, fr. *mons*, and *pelion*, Montpelier, a town in France.
- Montana, fr. *mons*, a mountain.
- Montia, named in honour of J. de Monti, a botanist of Bologna, 655; *M. fontana*, 655
- Moonwort, Dan. *miltwort*, or spleenwort, 190
- Morel, and Morchella, fr. Ger. *morchel*, morell, 146
- Morphology, 65, 66
- Moschatus, a, um, and Moschatellina, fr. *μοσχος*, musk, having a smell of musk.
- Motherwort, Dan. *hierte-span*, 433
- "Mountain ash no eye can overlook * * *
Deck'd with autumnal berries that out-shine
Spring's richest blossoms," 615
- Mouse-ear Chickweed, Dan. *mus-ore*, *mus-ore*, and *muse-ore*, ancient glossary, 50, 467, 469, 774
- Mouse-tail, Dan. *muse-rumpe*, 783
- Mucedo, pl. Mucedines, mould and moulds, name fr. *muceo*, or *mucescere*, to become musty or mouldy, 156
- Mucronatus, a, um, mucronate, with a point, fr. *mucro*, a short point.
- Mudwort, 444
- Mulgédium, fr. Lat. *mulgère*, to milk, a milky plant, 540; *M. alpinum*, 540
- Mullein, Dan. *konge-lys* (king's-candle), *mollis*, soft (?), 458, 460
- Mulsa is *mede und beer* (mead and beer); Mustum is *wyn unt mede* (wine and mead).
- Muricatus, a, um, fr. *murex*, a shell, beset with hard wartlike processes.
- Murorum, Muralis, e, and Murinus, a, um, of the walls, or growing on walls, or belonging to a wall, fr. *murus*, a wall.
- Muscari, fr. *μοσχος*, musk, a smell yielded by some species; *M. racemosum*, fr. *racemus*, a cluster, 303
- Mushroom, 156
- Mustard, Fr. *moutarde*, fr. Lat. *mustum-ardens*, 698, 699, 700, 703, 714. "Le mout ou vin doux entre dans la preparation de la moutarde; a mosto et ardore," Scaliger. (See Mulsa and Mustum, *supra*.)
- Myosotis, fr. *μύς*, a mouse, and *οὐς*, gen. *οὔς*, an ear, 50, 467; *M. arvensis*, 468; *M. cæspitosa*, 467; *M. collina*, 469; *M. intermedia*, 468; *M. palustris*, 467; *M. repens*, 467; *M. suaveolens*, 463; *M. sylvatica*, 463; *M. versicolor*, 469
- Myosurus, fr. *μύς*, mouse, and *οὐρα*, a tail, 783; *M. minimus*, 783
- Myrica, fr. *μύσκη*, which the Greeks applied to the tamarix; *M. Gale*, Gaul, *gaelic*, 357
- Myriophyllum, fr. *μύριος*, ten thousand, and *φύλλα*, leaves, 606; *M. alterniflorum*, 607; *M. spicatum*, 606; *M. verticillatum*, 606
- Myrrhis, fr. *μύρρα*, and *μύρρις*, Heb. *mur*, *mara*, bitter, 603; *M. odorata*, 603
- Naïas, fr. *Nayas*, a water nymph; *N. flexilis*, 282
- Nanus, a, um, dwarf.
- Narcis-us, fr. *Ναρκισσος*, a poetic-mythic hero, who fell in love with himself, not an uncommon ailment, but few die of it, as this unhappy youth did, 326; *N. biflorus*, 327; *N. poeticus*, 326; *N. Pseudo-narcissus*, 327
- Nardeæ and Nardus, fr. *νάρδος*, nard, 238; *N. stricta*, 238
- Narthecium, fr. *νάρθη*, a rod, 304; *N. ossifragum*, fr. *ος*, a bone, and *frango*, I break.
- Nasturtium, fr. *nasus* and *tortus*, it causes the eater to make wry faces, 697; *N. amphibium*, 697; *N. officinale*, 697; *N. palustre (terrestre)*, 698; *N. sylvestre*, 698
- Natans, swimming or floating.
- Navelwort, Dan. *navle-urt*, 648
- Nemorum, of groves, fr. Lat. *nemus*, a grove, and *nemorosus*, a, um, belonging to groves.
- Nemorosus, a, um, fr. Lat. *nemus* gen. *nemoris*, a grove; growing among trees.
- Neottia, and Neottiae, fr. *νεοστος* or *νεοτος*, young birds, fr. *neos*, young, 320; *N. nidus-avis*, bird's-nest, 320
- Népêta, and Nepetææ, 426; *N. cataria*, fr. *catus*, a cat, cat-mint, 426
- Neslia, 710; *N. paniculata*, 710
- Nettle, Dan. *nælde*, Ger. *nessel* and *nettel*, 367, 368
- Nicotianææ, a tribe of Solanaceæ, 462
- Nidularia, a little nest, fr. *nidus*, a nest; a genus of fungi, resembling exquisitely delicate little nests, with a few ovules at their base, 156
- Niger, nigra, um, black; nigricans and nigrescens, blackish.
- Nightshade, 460, 461, 462
- Nipplewort, Dan. *hare-kaal*, 531
- Nitela, fr. *niteo*, I brighten; *N. Borreri*, 169; *N. glomerata*, 167; *N. gracilis*, 168; *N. mucronata*, 168; *N. polysperma*, 169; *N. prolifera*, 169; *N. syncarpa*, 168; *N. tenuissima*, 169; *N. translucens*, 168
- Nitens, shining.
- Nitidus, neat.
- Nivalis, of or belonging to snow, fr. Lat. *nix*, gen. *nivis*, snow.
- Nobilis, noble.
- Noctiflorus, a, um, flowering at night, fr. *nox*, night, and *flos*, flower.
- Nodiflorus, flowering at the joints or knots.
- Nodulose and nodosus, fr. *nodus*, a knot, knotted, 5

Nondehiscence, 31
 Nonesuch, 664
 Nudiflorus, a, um, having naked flowers.
 Number of British species, 95
 Nuphar, fr. *νουφάρ*, of Dioscorides, 727; *N. luteum*, 727; *N. pumilum*, 727
 Nutans, fr. Lat. *nutat*, nods, in allusion to the drooping position of the flowers in some plants.
 Nutrition, 38
 Nut-tree. Dan. *hassel*, 351
 Nymphæa, and Nymphæacææ, fr. *nympha*, a nymph, 726; *N. alba*, 727
 Oak, Dan. *eeg*, A. S. *æc*, 37, 353
 Obcordate, obversely heart-shaped, the broader end uppermost, 13
 Obione, 391; *O. pedunculata*, 391; *O. portulacoides*, 391
 Oblong, elliptical and blunt at both ends.
 Obovate, obversely ovate, with the broader end uppermost, 13
 Odontites, fr. *οδους*, a tooth.
 Odoratus, a, um, fr. *odor*, odoriferous.
 Oenanthe, fr. *οινος*, wine, and *ανθος*, flower, a name anciently given to some plant with a vinous odour, 6, 589; *O. crocata*, crocus-like, in allusion to its yellow juice, 591; *O. fistulosa*, 590; *O. fluviatilis*, 592; *O. Lachenalii*, named in honour of W. de Lachanal, a Swiss botanist, 591; *O. Phellandrium*, fr. *φελλος* and *δρυς*, cork-tree, 591; *O. pimpinelloides*, 590; *O. silaifolia*, 590
 Oenothera, fr. *οινος*, wine, and *θηρα*, prey, caught the wine flavour or odour, 610; *O. biennis*, 611
 Officialis, officinal, sold in shops, fr. *officina*, a shop.
 Old-man's-beard, Ger. *weissbart*, Dut. *grysbard*, It. *geropogon*.
 Oleaceæ, fr. *oleum*, oil, 485
 Oleaster, wild olive, fr. *oleum*, oil, 485
 Onagraceæ, fr. *οναγρος*, *ονος*, an ass, and *αγρος*, wild, Fr. *onagre* (*œnothera*), *herbe aux anes*, so called because it was believed that the ass prefers it to a thistle, 607
 Onobrychia, fr. *ονος*, an ass, and *βρυχη*, food, 683; *O. sativa*, 683
 Ononis, fr. *ονος*, an ass, 660; *O. antiquorum* (of the ancients), 661; *O. arvensis*, 660; *O. reclinata*, 661
 Onopordum, fr. *ονος*, an ass, and *περδω*, Lat. *pedo*, q. v., 502; *O. Acanthium*, 503
 Ophioglossacææ, and Ophioglossum, fr. *οφίς*, serpent, and *γλωσσα*, a tongue; *O. lusitanicum*, 190; *O. vulgatum*, 190
 Ophrys, fr. *οφρυς*, eye-lashes, 318; *O. apifera*, fr. *apis*, a bee, 74, 318; *O. arachnites*, fr. *αράχνη*, a spider, 74, 319; *O. aranifera*, fr. *aranea*, spider, and *fero*, I bear, 74, 319; *O. fucifera*, fr. *fucus*, a drone, &c., 319; *O. muscifera*, fr. *musca*, a fly, &c., 317
 Oporinia, 535; *O. autumnalis*, 535
 Opulus, or water-elder, or guelder-rose, 564
 Orache, or Arrache, or Orage, fr. *aurum*, gold, a valuable herb, 388, 390

Orbicular, and Orbicularis, quite round, fr. Lat. *orbis*, a circle.
 Orchid, Ger. *ragwurz*, 33, 74, 81, 89, 314
 Orchidacææ, and Orchis, 313, 314, 320; *O. fusca*, 314; *O. hircina*, fr. *hircus*, a goat, the plant having a rank smell, 316; *O. latifolia*, 316; *O. laxiflora*, 315; *O. maculata*, 315; *O. mascula*, fr. *mas*, a male, 315; *O. militaris*, 314; *O. Morio*, fr. *morio*, folly, and *morio*, a fool, 315; *O. pyramidalis*, 316; *O. tephrosanthos*, fr. *τεφρος*, grey, and *ανθος*, a flower, 315; *O. ustulata*, 314
 Organs, compound, 3
 Organic bases, 39
 Origanum, fr. *opos*, a hill, and *γανω*, I love, 422; they grow in open places; *O. vulgare*, 423
 Ornithopus, fr. *ορνις*, and *πους*, bird's-foot, 682; *O. perpusillus*, 682
 Ornithogalum, fr. *ορνις*, a bird, and *γαλα*, milk, or pigeon's milk, for which the *gouks* are dispatched on the feast of All-fools; *O. nutans*, 300; *O. pyrenaicum*, 299; *O. umbellatum*, 299
 Orobanchacææ, and Orobanche, fr. *οροβος*, and *αγγειν*, to strangle, because they infest the roots of leguminous and other plants, 454; *O. amethystea*, like an amethyst, 456; *O. arenaria*, 457; *O. caryophyllacææ*, 455; *O. cœrulea*, 457; *O. elatior*, 455; *O. Hederæ*, 456; *O. minor*, 456; *O. Picridis*, 456; *O. ramosa*, 457; *O. rapum*, 455; *O. rubra*, 456
 Orpine, Dan. *kraeft-urt*, 650
 Orthotropical, fr. *ορθος*, right, and *τροπω*, I turn, when the foramen is opposite to the hilum, 29, 30
 Orthospermæ, fr. *ορθος*, straight, and *σπερμα*, seed, 579
 Osier, 340, 336, 350. (See Willow.)
 Osmunda and Osmundææ, fr. A. S. *Osmund*, a proper name, fr. *os*, heroic, and *mund*, defence, hence *manus* (?), 189; *O. regalis*, royal, fr. *rex*, king, 189
 Ovatus, ovate, like an egg, fr. *ovum*, egg, the section of which is ovate, 13
 Ovary, fr. *ovarium*, 27
 Ovule, the immature seeds, 28; ascending, 30; descending, 30
 Oxalidacææ, and Oxalis, fr. *οξυς*, acid, 753, 754; *O. Acetosella*, 754; *O. corniculata* (cornu), 754; *O. stricta*, 754
 Ox-eye, Dan. *oze-oeye*, 516; Ox-eye daisy, 52; Ox-heel is bear's-foot; Ox-tongue, Dan. *oze-tunge*, 465, 536 (Ossentunge, buglossa); Ox-ear is Anemone nem., Dan. *oze-oere*.
 Oxxyria, fr. *οξυς*, sharp, 382; *O. reniformis*, 383
 Oxytropis, fr. *οξυς*, sharp, and *τροπισ*, a keel, sharp-keeled, a character of the genus, 674; *O. campestris*, 674; *O. ura-lensis*, 674
 Pæonia, a mythic name; a physician who cured Pluto; *P. corallina*, 791
 Paigies, or Pagilis, Dan. *koblomme*, 406
 Pallescens, fr. *pallesco*, I become pale.

- Palmaris**, and **Palmaris**, fr. *palma*, having lobes like the fingers of the hand, 15
- Paludal** or **Palustral**, 75; **Paludosus**, a, um, and **Palustris**, e, fr. *palus*, gen. *paludis*, a marsh, 75
- Panicæus**, a, um, fr. *Panicum*, like a panic-grass.
- Panicæe**, and **Panicum**, fr. *panis*, bread (?), because some of the species yield bread-corn, 193, 194; *P. Crus-galli*, fr. *crus*, a leg, and *gallus*, a cock, 194
- Paniculatus**, a, um, in a panicle, fr. Lat. *panicula*.
- Pansy**, Dan. *trefoldigheds blom* (tricolor), 688. "Pansy freaked with jet."
- Papaver**, and **Papaveraceæ**, fr. Cel. *papa*, because it was exhibited as pap, C. B. *pabi*, hence poppy, 24, 33, 723; *P. Argemone*, fr. *ἀργεμόνη*, a remedy for a disease of the eye, 56, 724; *P. dubium*, 724; *P. hybridum*, 724; *P. nudicaule*, 724; *P. Rhæas*, fr. *ῥόια*, pomegranate, which the capsule resembles; *granat-apple*, in allusion to the shape of the fruit, 724; *P. somniferum*, fr. Lat. *somnus*, sleep, and *fero*, I cause, 723
- Papilionaceous**, fr. *papilio*, a butterfly, 25
- Paradoxa**, like *ambiguus*, *dubius*, &c. It means that the species is doubtful or paradoxical.
- Parenchyma**, fr. *πάρα*, about, and *εἴχυμα*, extended in all directions around, 13; **Parenchymatous**, adj., an effusion, porous, fleshy, cellular, 153
- Parietaria**, fr. *paries*, a wall, 369; *P. officinalis*, 369
- Paris**, fr. *par*, equal, four sepals, four petals, &c., 308; *P. quadrifolia* (four-leaved), 308
- Parnassia**, fr. *Mount Parnassus*, 26, 729; *P. palustris*, 729
- Parnassus**, grass of, 729
- Parsley**, bur, 585, 586, 600; fool's or dog's, 589; garden, 65; piert, 647
- Parsnep**, sea, 605; water, 587; cow's, 597
- Partite**, or **parted**, divided into segments nearly to the base, 14; **bi partite** (two-parted), **tri partite** (three-parted).
- Parviflorus**, a, um, small-flowered.
- Pascual plants**, 78
- Pastinaca**, fr. *pasco*, I eat, *pastus*, eatable, 596; *P. sativa*, 597
- Patulus**, a, um, spreading, "patulæ subtegmine fagi."
- Pauciflora**, fr. *pauci* and *flores*, few-flowers.
- Paul's Betony** (Thyme-leaved Speedwell), 49, 441
- Pendulus**, a, um, pendulous, fr. *pendere*, to hang down.
- Piluliferus**, a, um, bearing hairs.
- Præcox**, early.
- Pulicaris**, fr. Lat. *pulex*, a flea, like a flea.
- Pea**, 30, 657, 680, 681
- Pear**, fr. Cel. *peren*, 54, 614
- Pearlwort**, 768, 769
- Pectinatus**, having a comb, fr. *pecten*, a comb.
- Pédate**, fr. *pes*, a foot, when the lateral leaflets of a palmate or digitate leaf are united, as in many Rubi, 16
- Pedatifidus**, a, um, like palmate, but having the lateral lobes divided. (See **Pedate**, and Fig. 47, p. 16.)
- Pedice**, a little foot, fr. *pes*, a foot, 20
- Pedicularis**, fr. *pediculus*, a parasitical hexapod, and *morbus pedicularis*, for which these plants were specifics, 71, 450; *P. palustris*, 450; *P. sylvatica*, 450
- Peduncle**, fr. *pes*; a little foot, 20
- Pedunculatus**, a, um, peduncled.
- Pellitory**, Dan. St. Peder's-urt, *dag-og-nat* (day-and-night), 369
- Peltate**, fr. *pelta*, a buckler (Fig. 17, p. 11).
- Pendulus**, a, um, pendulous; drooping, fr. *pendere*, to hang, 27
- Pennatus**, fr. *penna*, a feather, resembling a feather.
- Penny-cress**, Dan. *penge-urt*, 712
- Penny-royal**, Dan. *vand-poley* (water-poley), 420
- Pepper saxifrage**, 593
- Pepperwort**, 714, 715
- Peplis**, 656; *P. Portula*, 657
- Perennial**, fr. Lat. *perennis*, e, fr. *per*, and *annus*, of long duration, 42
- Perfoliatus**, a, um, and **Perfoliate**, the leaf surrounding the stem, 17
- Perianth**, fr. *περι*, about, and *ανθος*, flower, 70
- Pericarp**, on or around the fruit, fr. *περι*, and *καρπος*, fruit, 30
- Perigynous**, fr. *περι*, about, and *γυναι*, the organs of fructification, 33
- Peristome**, the teeth about the urn-like theca of a moss, fr. *περι*, about, and *στομα*, the mouth, 161
- Periwinkle**, fr. *pervinco*, A. S. *pervince*, 50, 484
- "There sprang the violet al newe,
And rich perwinke rich of hewe."
Chaucer.
- Permanent** or **persistent**, 62
- Petasites**, fr. *πετασος*, a cover, which the leaves afford, 530; *P. vulgaris*, 530
- Petiole**, a leaf-stalk, 11; **lamina**, the blade or flat part of a leaf, 11
- Petiolaris**, having a petiole.
- Petræa**, us, um, fr. *πετρος*, a rock.
- Petroselinum**, fr. *πετρος*, a stone, and *selinum*, parsley, 585; *P. sativum*, 586; *P. segetum*, fr. *seges*, growing corn, 586
- Peucedanæe** and **Peucedanum**, fr. *πενκη*, a pine, and *δαρος*, fr. *δανειζω*, I increase; *P. officinale*, 596; *P. Ostruthium*, fr. *στρουθιον*, a sparrow (?), 596; *P. palustre*, 596
- Peziza**, or **Pezica**, a name given by Pliny to some fungus. A genus of beautiful cup- or saucer-shaped fungi.
- Phalaridæe** and **Phalaris**, fr. *φαλος*, shining, 193; *P. Arundinacea*, 196; *P. canariensis*, 196; *P. paradoxa*, 196
- Phallus**, a genus of fungi, fr. *φαλλος*, (Priapus), 156
- Pheasant's-eye**, 783

- Philodoe, *φιλεω*, I love, 491; *P. cœrulea*, 491
- Phleum, *φλεος* = reed-mace, 197; *P. pratense*, 197; *P. Boehmeri*, 198; *P. Micheli*, 198; *P. arenarium*, 198; *P. asperum*, 198; *P. alpinum*, 199
- Phragmites, fr. *φραγκων*, a thorn hedge, 217; *P. communis*, 217
- Physiology of the embryo, 63; of the reproductive organs, 62
- Physospermum, fr. *φυσσα*, a bladder, and *σπερμα*, seed, 604; *Ph. cornubiense*, fr. *Cornovia*, Cornwall, where the plant grows, 604
- Phyteuma, fr. *φυτευμα*, and *φυτον*, a plant, 499; *P. orbiculare*, 499; *P. spicatum*, 499
- Phytology, fr. *φυτος*, a plant, and *λογος*, science, knowledge, 1
- Picris, fr. *πικρος*, bitter, 536; *P. hieracioides*, 536
- Pig-nut, or earth-nut, 53, 538
- Pilcorn, *avena fatua*, 213
- Pilewort, the Danish pilewort is *Polygonum amphibium*, 787
- Pilosus, a, um, hairy, and *Piluliferus*, a, um, fr. *pilus*, a hair, and *fero*, I bear.
- Pilosellen-muschoren, mouse-ear, 543
- Pimpernel, fr. *pampinus*, a vine-shoot, 30, 411
- Pimpinella, fr. *bipennula*, as Linnaeus conjectures; Pimpernel, Ger. *biebernel*, fr. *bieber*, a beaver, beaverwort, 588; *P. magna*, 588; *P. Saxifraga*, 588
- Pine, ground, 436
- Pine family, 332
- Pinguicula, fr. *pinguis*, fat, because of the unctuous leaves, 413; *P. alpina*, 413; *P. grandiflora*, 413; *P. lusitanica*, 413; *P. vulgaris*, 413
- Pink, 30, 757, 760
- Pinna, the primary division of a pinnate leaf.
- Pinnæ, the primary leaflets of a pinnate leaf; pinnules are the secondary leaflets.
- Pinnatifid, fr. *fido*, I cleave, and *pinna*, a feather; leaf divided nearly to the axis into segments, as a feather is, 14
- Pinnatum, us, a, pinnate, leaflets arranged on both sides of a common petiole.
- Pinnate, or pinnated, fr. *pinna*; a feathered leaf, 16. Bipinnate, twice-pinnated or feathered, 16. Unequally pinnate, when there are more leaflets on one side than on the other, or when the whole is terminated by an odd leaflet, 16
- Pinus, Cel. *ben* or *pen* or *pin*, mountainous parts, where this tree grows (?), 333; *P. sylvestris*, 333
- Piony, 791
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- Placenta, that part of the ovary which bears the ovules, 29
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- rogamæ, fr. *φανeros*, evident, and *γamos*, union, 32; Plantæ ductulosæ, 3; Plantæ eductulosæ, 3; Plantæ cryptogamæ, 32
- Plantaginacæ and Plantago, fr. *πλατυς*, broad, and Lat. *planta*, the foot (see "Phytologist," N. S., vol. i. p. 14), 51, 399; *P. arenaria*, 401; *P. Coronopus*, crowfoot, 401; *P. lanceolata*, 401; *P. major*, 400; *P. maritima*, 401; *P. media*, 401
- Plantain, Dan. *vey-brede*, and *faare-tunge* (sheep's-tongue), 399, 400
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- Plicate and plicatus, a, um, fr. *plica*, a fold, folded, 18
- Plowman's spikenard, Dan. *trold-urt* (wizard-wort) 523
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- Plumbaginacæ, fr. *plumbum*, lead, because some of the species are of a leaden colour, 402
- Plumule, fr. *plumula*, a little feather, 31, 36
- Pluri-locular, multi-locular, having several or many cells, 28
- Poa, fr. *ποη*, a grass; *P. alpina*, 219; *P. annua*, 218; *P. Balfourii*, 220; *P. bulbosa*, 218; *P. caesia*, 219; *P. compressa*, 221; *P. laxa*, 218; *P. minor*, 219; *P. montana*, 220; *P. nemoralis*, fr. *nemus*, a grove, 219; *P. Parnellii*, 220; *P. polynoda*, *πολυσ*, and *nodus*, a knot, 221; *P. pratensis*, 220; *P. sudetica*, fr. the name of a chain of mountains in Germany, where this grass grows; *P. trivialis*, 221
- Podagraria, gout, fr. *πους* and *ager*.
- Poeticus, a, um, poetic.
- Polemoniaceæ, Polemonium cœruleum, fr. *πολεμος*, war, 28, 477, 478. Two kings went to war about this plant, "reges delirant plectuntur Achivi."
- Pollen-grains, 28
- Polycarpon, fr. *πολυσ*, much, and *καρπος*, fruit, 654; *P. tetraphyllum*, four-leaved, 654
- Polygala and Polygalacæ, fr. *πολυσ*, much, and *γαλα*, milk, 739, 740 (per antiphrasin?); *P. austriaca*, 741; *P. calcurea*, 741; *P. vulgaris*, 740
- Polydelphous, fr. *πολυσ*, many, and *αδελφος*, a brother, 26
- Polygonacæ and Polygonum, fr. *πολυσ* and *γων*, many-angled, in allusion to the flexuous or bent stems, 30, 76, 89, 110, 373; *P. amphibium*, fr. *αμφι*, both, and *βιος*, life, it lives on both land and water, 375; *P. Bistorta*, fr. *tortus*, twisted, as the roots are, 375; *P. aviculare*, fr. *avis*, a bird, and *avicula*, a little bird, and *avicularia*, an aviary or bird-cage, 377; *P. convolvulus*, fr. *volvo*, I roll, 378; *P. dume-*

- tōrum, 378; *P. Hydρόπiper*, fr. *ῥῥωρ*, water, and *piper*, pepper, 377; *P. laxum*, 376; *P. maritimum*, 378; *P. minus*, 377; *P. mite*, 376; *P. Persicaria*, 376; *P. lapathifolium*, 377; *P. Raii*, in honour of the famous John Ray, 378; *P. viviparum*, 375
- Polygonatum, fr. *πολύς*, many, and *γων*, angle, 306; *P. multiflorum*, 306; *P. verticillatum*, 307; *P. vulgare*, 306
- Polygonous, fr. *πολύς*, many, and *γων*, the pistil, many pistils, 28
- Polypetalous, fr. *πολύς*, and *πεταλον*, having many petals, 24
- Polypodiæ and Polypodium, fr. *πολύς*, and *πους*, foot, 174; *P. alpestre*, alpine, 175; *P. calcareum*, fr. *calcar*, lime, where the species grows, 175; *P. Dryopteris*, fr. *δρυς*, an oak, and *πτερις*, a fern, 174; *P. flexile*, pliant, 175; *P. Phegopteris*, fr. *φeyos*, a beech, and *πτερις*, a fern, 174; *P. vulgare*, 174
- Polypogon, fr. *πολύς*, much, and *πωγων*, a beard, very hairy plants, 208; *P. littoralis*, fr. *littus*, the shore, 208; *P. monspeliensis*, 208
- Polypetalous, fr. *πολύς*, many, and *σπαλον*, a leaf, having many sepals, 23
- Polysperma, many-seeded, fr. *πολύς*, much, and *σπερμα*, seed.
- Polystachion, fr. *πολύς*, many, and *σταχυς*, an ear.
- Polystichum, fr. *πολύς*, many, and *στιχος*, row or rank, in allusion to the many-rowed fructifications, 179; *P. aculeatum*, fr. *acus*, a needle, sharp pointed, 179; *P. angulare*, fr. *angulus*, an angle, 180; *P. Lonchitis*, fr. *λογχη*, a lance, to which the frond has no slight resemblance, 180
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- Poppy, Dan. *korn-rose*, 723, 725
- Popular names, 124
- Populus, fr. *παλλω*, I brandish, and *παιπαλλω*, I quiver (?), Ger. *weissappel*, Dan. *poppel-trae*, 350; *P. alba*, 350; *P. canescens*, 350; *P. nigra*, 351; *P. tremula*, 351
- Porous, fibrous, and spiral cells, 2
- Porphyra, fr. *πορφυρα*, the purple snail, from which the exquisite Syrian dye was obtained, 154
- Portulacæ, 655, and *Pörtula*, a name applied to some plant whose leaves resembled little ports or gates.
- Potamaceæ, fr. *ποταμος*, a river where the species grow, 282
- Potamogeton, fr. *ποταμος*, river, and *γειτων*, near, 283; *P. acutifolia*, 287; *P. compressa*, 287; *P. crispa*, 285; *P. densa*, 286; *P. filiformis*, 287; *P. labellata*, 287; *P. luitans*, 285; *P. graminea*, 287; *P. heterophylla*, 284; *P. lanceolata*, 284; *P. longifolia*, 286; *P. lucens*, 285; *P. natans*, 283; *P. oblonga*, 284; *P. pectinata*, 288; *P. perfoliata*, 285; *P. plantaginea*, 285; *P. pusilla*, 287; *P. rufescens*, 284; *P. trichoides*, 288; *P. zosterifolia*, 287; *P. zosteracea*, 287
- Potentilla and Potentillæ, a genus and tribe of *Rosaceæ*, fr. *potentia*, power; *potentilla*, little efficacy, 21, 70, 621; *P. alba*, 624; *P. alpestris*, 623; *P. anserina*, 625; *P. argentea*, 623; *P. comarum*, fr. *κομαρος*, a name given by Theophrastus to some plant, 625; *P. Fragaria*, 621; *P. fruticosa*, 625; *P. opaca*, 623; *P. reptans*, 622; *P. rupestris*, 625; *P. Sibbaldia*, in honour of Dr. Sibbald, 624; *P. Tormentilla*, fr. *tormina*, dysentery, 622
- Potérium, means a drinking-cup, the leaves of this or some similar plant being used in the preparation of "a cool tankard," 645; *P. muricatum*, 646; *P. Sanguisorba*, 646
- Præcox, fr. *præ*, before, and *coquo*, early, early ready, rath ripe.
- Prælongus, very long.
- Præmorse, or truncate, 5
- Pratensis, e, fr. *pratium*, a meadow.
- Primine, 29, 31
- Primrose, fr. *primus*, and *rosa*, early flower, 25, 50, 405, 406, 407
- Primula and Primulaceæ, fr. *primus*, early, some of them flower early, 24, 31, 50, 71, 405, 406, 408; *P. elatior*, 406; *P. farinosa*, 406; *P. scotica*, 407; *P. veris*, 406; *P. vulgaris*, 406
- Privet, Print, or Primprint, fr. A. S. *prut*, pride, beauty, *pryfetæ* = privet, 50, 486
- Procumbens, fr. *procumbo*, I lean forwards, 8
- Proliferus, a, um, productive, fr. *proles*, offspring, and *ferre*, to bear.
- Propinquus, a, um, near.
- Prostratus, a, um, prostrate.
- Prunella, fr. Ger. *braune*, quinsy, hence Brunella and Prunella, 434; *P. vulgaris*, 434
- Prunus, fr. *προυννη*, Theoph., 617; *P. avium*, fr. *avis*, a bird, 618; *P. Cerasus*, same root as cherry, 619; *P. Padus*, 618; *P. spinosa*, 618
- Ptarmica, Gr. *παρμικη*, sneezewort, 513
- Pterides and Pteris, fr. *πτερις*, a fern, fr. *πτερον*, a wing, 187; *P. aquilina*, *aquila*, an eagle, 187
- Pubescens, fr. *pubes*, down, downy.
- Pudding-grass, Pulegium.
- Pulchellus, a, um, fair.
- Pulicæria, fr. *pulex*, a flea, flea-wort or bane, 522; *P. dysenterica*, 522; *P. vulgaris*, 522
- Pulicæris, fr. *pulex*, a flea.
- Pullus, a, um, pale or black (?), *pullum olus* or *olusatrum*, a black herb.
- Pulus, a, um, a sprout or shoot.
- Pulmonaria, fr. *pulmo*, the lungs, Dan. *lung-urt*, 470; *P. angustifolia*, 471; *P. officinalis*, 471
- Pyræthrum, fr. *πυρεθρον*, and *πυρ*, fire, 515; *P. Chamomilla*, 515; *P. inodorum*, 516; *P. Leucanthemum*, *λευκος*, white, 516; *P. maritimum*, 516; *P. Parthénium*, 516
- Pulverulentus, a, um, fr. Lat. *pulvis*, powder, powdery.
- Purpureus, a, um, purple.
- Pusillus, a, um, small.

- Pyramidalis, shaped like a pyramid.
Pyrola and *Pyrolacæ*, fr. Lat. *pyrus*, a pear, *pyrola*, a little pear, 50, 735; *P. media*, 735; *P. minor*, 735; *P. rotundifolia*, 735; *P. secunda*, one-sided, or flowers on one side, or unilateral, 736
Pyrus, fr. Cel. *peren*, a pear, 614; *P. communis*, 614; *P. Malus*, 614
- Quake-grass, or Cow-quake, Dan. *befvergæs*, 225
Quaternate, fr. *quatuor*, four, when four leaflets, &c., are attached to a common axis or centre, 16
Quercus, Cel. *quer*, beauty, and *quez*, tree, (uncertain); some say fr. *χοῖρος*, a hog, because hogs eat acorns; fr. the same root as cork, which is produced by one of the oaks. *Q. intermedia*, 353; *Q. pedunculata*, 353; *Q. sessiliflora*, not peduncled, 353
Quillwort or *Merlin's grass*, 164
Quinate, fr. *quinque*, five, when five are attached to a common axis, 16
Quince, 614
- Racemosus*, clustered, fr. *racemus*, a cluster.
Rach or *Rachis*, fr. *paxis*, the vertebra, backbone, stalk of a compound leaf, axis of a series of flowers.
Radiate, or whorled, in rays from a centre, 17
Radicatus, a, um, having a root, fr. *radix*, a root.
Radicle, a little root, fr. *radix*, a root, 31
Radiola, fr. Lat. *radius*, a ray, 757; *R. millegrana*, 757
Ragged Robin, 764—
 "When St. Barnaby bright smiles night and day,
 Poor Ragged Robin blooms in the hay."
Ragweed, 528, 529
Ramalina, fr. *ramus*, a branch, in allusion to the branching mode of their growth, a genus of Lichens, 160
Rames-ader, *herba salutaris*; *Rames-ore*, *herba salviarum*.
Ramosus, a, um, branchy, abounding in branches, fr. Lat. *ramus*, a branch.
Rampions, Dan. *rapunzel*, 52, 496
Rams = *Allium* us. and *Orchis bifolia*, fr. *ram*, rank, ill-scented, hence *rammish*, a smell like that of some plants, and especially that of the chestnut, when in flower.
Ramson, fr. Dan. *rams*, a leek, *hramæ*, ancient glossary, 301
Ranunculacæ, fr. *rana*, a frog, and *colere*, to dwell, they grow in marshes with the frogs, 24, 33, 84, 120, 121, 779, 783
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Raphanus, fr. *ραδιως*, early, and *φαίνω*, I appear, *παρὰ το ραδιως φαίνεσθαι*, it springs up in three days, it speedily springs up, 718; *R. Landra*, 719; *R. maritimus*, 719; *R. Raphanistrum*, 718
Raspberry, Dan. *hind-bær*, Ger. *him-baere*, 54, 626
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Receptacle, fr. *recipio*, I receive, 20. (See *Compositæ*.)
Rectus, a, um, erect or straight.
Recurrent, reclining, 8
Recurvatus, a, um, recurved, bent outwards from the axis.
Redshanks is *Tillæa muscosa*, q. v., 652
Reed-mace, 275
Reflexus, a, um, reflexed.
Repens, creeping, 7
Reptans, rooting at spaced distances, as the strawberry.
Reseda and *Resedacæ*, fr. *sedo*, I am a sedative, 29, 728; *R. lutea*, 728; *R. Luteola*, 728; *R. suffruticulosa*, 728
Rest-harrow, Dan. *krage-torn* (crow-thorn), 660
Resupinatus, a, um, inverted, that which is usually underneath being uppermost.
Reticulatus, a, um, netted, fr. *rete*, a net.
Retusus, a, um, blunt and depressed at the end.
Revolute, fr. *re* and *volvo*, I roll outwards, 18
Rhamnaceæ and *Rhamnus*, fr. *ramus*, a branch, *ramesan*, ancient glossary, 684; *R. catharticus*, 684; *R. Frangula*, 685
Rhinanthus, fr. *ριν*, a snout, and *ανθος*, a flower, the flowers are spurred, 71, 450; *R. Crista-galli*, cock's-crest or comb, 451; *R. major*, 451
Rhodoménia, fr. *ροδοεις*, rosy, and *ρουν*, a membrane, in allusion to the colour and consistence of the plants, a genus of Algae (Algæ), 154
Rhizanthus, 116
Rhizome or root-stock, 7
Rhynchospóra, fr. *ρυγκος*, a beak, and *σπορος*, a seed, seed or nut (fruit) beaked, 258; *R. alba*, 258; *R. fusca*, 258
Ribes, pl., bastard corinths (currants), 571; *R. alpinus*, 572; *R. Grossularia*, 572; *R. nigrum*, 573; *R. rubrum*, 572; *R. petraeum* and *spicatum*, varieties of *R. rubrum*.
Ribgrass or *Ribwort*, *ribbewort*, 51, 401
Riccia and *Ricciacæ*, named in honour of P. F. Ricci, an Italian botanist, 161
Rigidus, a, um, fr. *riget*, it is stiff.
Riparia, us, um, fr. *ripa*, a bank; growing on the banks of rivers.
Roan or *Rowan-tree*, fr. Dan. *rön*, Scot. *ran-tree* or *roddin-tree*, 54, 615
Roccella, a genus of Lichens, name from the discoverer of its valuable properties as a dye-material, 159; *R. tinctoria*, fr. *tingo*, I stain, 159
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Rocket-sea, 717

- Roemeria, fr. Roemer, a celebrated botanist, 725; *R. hybrida*, 725
- Rosa and Rosaceæ, Gr. *ροδον*, 70, 81, 86, 122, 619, 639
- Roseæ and Rosa, 639; *R. arvensis*, 643; *R. canina*, 640; *R. cinnamomea*, Heb. *kinamon*, a spice, 644; *R. Dicksoni*, 644; *R. hibernica*, 642; *R. inodora*, 641; *R. involuta*, 642; *R. micrantha*, 641; *R. rubiginosa*, 641; *R. Sábini*, 642; *R. sepium*, 641; *R. spinosissima*, 643; *R. systyla*, 643; *R. tomentosa*, 642; *R. villosa*, 641; *R. Wilsoni*, 643
- Rosemary, Dan. *vild-rosmarin*, 491
- Rosette, fr. *rosa*, a rose, when the leaves are arranged as the petals of a rose they are rosulate, or in a rosette, 16
- Rose-root, Ger. *rosen-wurzel*, 651
- Rotundifolius, a, um, round-leaved, fr. Lat. *rotundus*, round, and *folium*, a leaf.
- Rubens, reddening.
- Rubia, 563, and Rubiaceæ, 52, 81, 558 (see Rubus); *R. peregrina*, 563
- Rubiginosus, a, um, rusty, fr. *robigo*, and *rubigo*, rust.
- Rubus, 626. "Ita dictum quod virgulta ejus rubeant, vel quod mora rubra ferat," Perot. Its shoots are reddish, and it sometimes bears a red berry; hence the name. *R. affinis*, 628; *R. affinis*, 629; *R. amplifolius*, 629; *R. arcticus*, 637; *R. argenteus*, 632; *R. balfourianus*, 630; *R. Borreri*, 632; *R. Bellardi*, 635; *R. Bloxamii*, 634; *R. cæsius*, 636; *R. carpinifolius*, 630; *R. chamæmorus*, 637; *R. corylifolius*, 630; *R. dýscolor*, 633; *R. glandulosus*, 635; *R. Grabowskii*, 628; *R. Guntheri*, 634; *R. hirtus*, 635; *R. humifusus*, 631; *R. idæus*, 626; *R. imbricatus*, 628; *R. incurvatus*, 628; *R. Kœhleri*, 634; *R. latifolius*, 630; *R. leightonianus*, 632; *R. leucostachys*, 632; *R. macrophyllus*, 631; *R. nemorosus*, 636; *R. nitidus*, 629; *R. pallidus*, 633; *R. pampinosus*, 631; *R. plicatus*, 627; *R. pyramidalis*, 634; *R. radula*, 636; *R. rhamnifolius*, 628; *R. rudis*, 633; *R. Salteri*, 630; *R. saxatilis*, 637; *R. scaber*, 635; *R. Sprengelii*, 632; *R. suberectus*, 627; *R. subulstris*, 630; *R. vestitus*, 632; *R. Wahlbergii*, 637
- Rue, Dan. *rude*, herb of grace, repentance.
- Rue-weed, Dan. *rude*, herb of repentance.
- Rufescens and Rufus, reddish, or red, or pale red.
- Rugosus, a, um, wrinkled.
- Rumex, fr. *ρῶμας* (*id quod trahitur*), because the plant was sucked to allay thirst; hence *rumen*, *ruminatio*, and *rumination*. A name given to some esculents, or acidulous, thirst-quenching salads, 379; *R. Acetosa*, 382; *R. Acetosella*, 382; *R. alpinus*, 382; *R. aquaticus*, 381; *R. conglomeratus*, 380; *R. crispus*, 381; *R. Hydrolopathum*, 3-1; *R. maritimus*, 379; *R. obtusifolius*, 380; *R. palustris*, 379; *R. pratensis*, 381; *R. pulcher*, 380; *R. sanguineus*, 380
- Rupestral plants, 85
- Rupestris, e, fr. *rupes*, growing on rocks.
- Rupture-wort, Dan. *brud-urt*, brud = breaking, 653
- Ruppia, named in honour of H. B. Ruppert, author of "Flora Jenensis," 288; *R. maritima*, 289; *R. rostellata*, fr. *rostellum*, a little beak, and *rostrum*, a beak, 289
- Ruralis, e, fr. *rus*, rural.
- Ruscus, *bruskus*, brush, Cel. *beuskelen*. The species were used for brooms, hence the English name, Butcher's-broom. *R. aculeatus*, 308
- Russelliana, smithiana, weigeliana, are commemorative of meritorious individuals; for example, the Duke of Bedford, Sir J. E. Smith, Stuart, Weigel, Woolgar, &c.
- Rye-grass, or rather Ray-grass, 233
- Saccharatus, a, um, sugary.
- Sach, Scottice, is *willow*, Swed. *såke*, 335, 351
- Saffron, 329
- Sage, 421. "How can a man die that has sage in his garden?"
- Sagina, Lat., and *σαγμα*, food which fattens (by antiphrasis), or the creatures that feed on it become lean, 767; *S. apetala*, 769; *S. ciliata*, 769; *S. densa*, 768; *S. maritima*, 768; *S. nodosa*, 767; *S. procumbens*, 768; *S. saxatilis*, 768; *S. subulata*, 768
- Sagittaria, fr. *sagitta*, an arrow, which the leaves of this plant much resemble, 293; *S. sagittæfolia*, arrow-leaved, 293
- Salicaceæ and Salix, fr. *salix*, I leap, of quick growth, 335; *S. acuminata*, 341; *S. acutifolia*, 339; *S. alba*, 338; *S. ambigua*, 347; *S. amygdalina*, 339; *S. andersoniæ*, 343; *S. angustifolia*, 348; *S. aquatica*, 342; *S. arbuscula*, 348; *S. aurita*, 342; *S. bicolor*, 344; *S. boreriana*, 344; *S. caprea*, 342; *S. carinata*, 349; *S. cineræa*, 341; *S. cotinifolia*, 343; *S. croweana*, 345; *S. cuspidata*, 338; *S. damascæna*, 343; *S. davalliana*, 344; *S. decipiens*, 338; *S. dicksoniana*, 345; *S. domiana*, 348; *S. ferruginea*, 341; *S. forbyana*, 340; *S. forteriana*, 343; *S. fragilis*, 338; *S. fusca*, 347; *S. glauca*, 346; *S. hastata*, 349; *S. Helix*, 340; *S. herbacea*, 350; *S. hirta*, 343; *S. hoffmanniana*, 339; *S. holosericea*, 341; *S. lambertiana*, 340; *S. lanata*, 349; *S. lappopnum*, 346; *S. laurina*, 344; *S. malifolia*, 346; *S. meyeriana*, 342; *S. myrsinites*, 349; *S. nigricans*, 343; *S. oleifolia*, 342; *S. pentandra*, 337; *S. petraea*, 343; *S. phlycifolia*, 343, 344; *S. procumbens*, 349; *S. propinqua*, 343; *S. prostrata*, 347; *S. prunifolia*, 349; *S. radicans*, 344; *S. repens*, 346; *S. reticulata*, 349; *S. rosmarinifolia*, 348; *S. rubra*, 340; *S. rupestris*, 343; *S. russelliana*, 338; *S. smithiana*, 341; *S. sphacelata*, 342; *S. stipularis*, 341; *S. stuartiana*, 346; *S. tenuifolia*, 345; *S. triandra*, 339;

- S. undulata*, 339; *S. vacceiifolia*, 348; *S. viminalis*, 340; *S. vitellina*, 339; *S. weigelia*, 345; *S. woolgariana*, 340
- Salicornia*, fr. *sal*, salt, and *cornu*, a horn, 384, 392; *S. herbacea*, 392; *S. radicans*, 392
- Sallow, Scot. *sauch*, 342
- Sallowthorn, 358
- Salsola, fr. *als*, sea, or *sāl*, salt, in which they abound, 384; *S. kali*, an Arabic word, 892
- Saltwort, Dan. *salt-urt* and *glas-urt*, 391, 392
- Salvia, fr. *salvo*, I am well, a salutiferous herb, 421; *S. clandestina*, 422; *S. pratensis*, 421; *S. verbenaca*, verbenalike, 421; *S. viridis*, 422
- Sambucus, fr. *σαμβυκη*, a musical instrument made of this wood, 565; *S. Ebulus*, 565; *S. igra*, 565
- Samolus, fr. Cel. *samul* and *samylen*. The Welsh name of this plant is *claellys* (see Davies, "Welsh Bot.," 24.) Both this plant and Selago were of great repute among the Druids. *S. Valerandi*, the name of a botanist, 410
- Samphire, a corruption of *Saint Pierre* (*San Pierre*), 594; golden, 523; prickly, 605
- Sandalwood, 396
- Sandwort, Dan. *sand-urt*, 766
- Sanguinalis, sanguineus, sanguinaria, fr. *sanguis*, blood, blood-red.
- Sanguisorba, fr. *sanguis*, blood, and *sorbere*, to absorb, 645; *S. officinalis*, 645
- Sanicle, 53, 580. "Qui a la bugle et la sanicle, fait aux chirurgiens la nique."
- Sanicula, fr. *sano*, I heal, a plant of sanative properties, 580; *S. europæa*, 580
- Santalaceæ, an order of Dicotyledons, 31; Sandalwood, 396
- Sap, ascent of, 37
- Saponaria, fr. *sapo*, soap, for which these plants were anciently substitutes, 760; *S. officinalis*, 761; *S. vaccaria*, fr. *vacca*, a cow, 761
- Sarothamnus, 658; *S. scoparius*, 658, fr. *scopæ*, a broom.
- Sassaüræa, in honour of *Saussure*, a celebrated Swiss naturalist, 508; *S. alpina*, 508
- Sativus, a, um, that may be cultivated, fr. Lat. *sero*, I sow or plant.
- Sauch, Scot., sallow, willow, 342
- Saw-wort, Ger. *schartendistel*, 508
- Saxatilis, e, growing on rocks.
- Saxifraga, fr. *saxum*, a stone, and *frango*, I break, was a specific in calculous disorders, 574; *S. affinis*, 576; *S. aizoides*, 577; *S. Andrewsii*, 575; *S. cæspitosa*, 576; *S. cernua*, 577; *S. Geum*, 574; *S. granulata*, 53, 577; *S. Hirculus*, 575; *S. hirsuta*, 574; *S. hirta*, 575; *S. hypnoides* (*corrige* *hypnoides*), 576; *S. muscoides*, 577; *S. nivalis*, 578; *S. oppositifolia*, 53, 578; *S. palmata*, 576; *S. pedatifida*, 576; *S. rivularis*, 578; *S. stellaris*, 575; *S. tridactylites*, 53, 577; *S. umbrosa*, 575
- Saxifrage, stone-break, A. S. *steen-breke*, 573, 578; golden, 53, 574
- Scaber, scabra, um, and scabriusculus, rugged, and rather rugged, has the same root as *scabies* or *scab*.
- Scabiosa, fr. Lat. *scabies* or *scab*, 554; *S. columbaria*, fr. *columba*, dove, 554; *S. succisa*, 554
- Scabious, or scabwort, Dan. *skab-urt*, 52, 544
- Scandent, fr. *scandeo*, I climb, 8
- Scandix, fr. some word now lost, which meant to give pain, as a prick in the flesh, hence scandal, fr. *σκανδαλιζω*, 603; *S. Pecten-veneris*, Venus'-comb, 603
- Scheuchzeria, fr. Scheuchzer, a celebrated Swiss botanist, 289; *S. palustris*, 290
- Schoberia, 384; *S. fruticosa*, 391; *S. maritima*, 391
- Schoenus, f. *σχοινω*, I twist, a general name of plants, which were twisted into bands or cords, 266; *S. nigricans*, 266
- Scilla and Scilleæ, fr. Lat. *squilla*, a sea union, 298; *S. autumnalis*, 300; *S. bifolia*, 300; *S. verna*, 300
- Scirpæ and Scirpus, fr. Cel. *cirs*, pl. *cors*, hence cord, 260; *S. cæspitosus*, 260; *S. carinatus*, 262; *S. compressus*, 263; *S. fluitans*, 260; *S. Holoschoenus*, 261; *S. lacustris*, 261; *S. maritimus*, 262; *S. parvulus*, 261; *S. pauciflorus*, 260; *S. Rothii*, 262; *S. rufus*, 263; *S. Savii*, 261; *S. setaceus*, 261; *S. sylvaticus*, 263; *S. triqueter*, 262
- Scleranthus, fr. *σκληρς*, hard, and *ανθος*, flower, 654; *S. annuus*, 654; *S. perennis*, 654
- Sclerochloa, fr. *σκληρος*, hard, and *χλοη*, a kind of grass, in allusion to the hardness of the herbage, 223; *S. Borreri*, 224; *S. distans*, 223; *S. loliacea*, 224; *S. maritima*, 223; *S. procumbens*, 224; *S. rigida*, 224
- Scelopendrium, *σκολοπενδρα*, millepes, 186; *S. vulgare* (*officinale*, *europæ*), 186
- Scorpion-grass, Dan. *scorpions-urt*, 467
- Scotch parsley or lovage, q. v., 593
- Scorodonia, fr. *σκοροδον*, contracted *σκοροδον*, a leek.
- Scrophularia and Scrophulariaceæ, fr. *scrofula*, the scurvy, which plants of this order were believed to cure, 49, 81, 83, 89, 110, 438, 445; *S. aquatica*, 445; *S. Ehrharti*, 446; *S. nodosa*, 7, 445; *S. Scorodonia*, 446; *S. vernalis*, 446
- Scutellaria and Scutellarineæ, fr. *scutella*, a buckler, 434; *S. galericulata*, helmet-bearing, 435; *S. minor*, 435
- Scurvy-grass, Dan. *skior-bugs-urt* (scurvy), 709
- Sea-chickweed, 771; Sea-heath, 776; Sea-holly, 581; Sea-kale, 718; Sea-milkwort, 410; Sea-parsnep, 605
- Secale, fr. Cel. *segal*, rye, 237; *S. cereale*, fr. *Ceres*, a mythological deity, to whom the cereal plants were dedicated, 237
- Secund, or unilateral, all on one side, "Irish reciprocity," 31
- Secundine, one of the coats of the true seed or embryo, 29
- Sedge, Dan. *siv*, Scot. *seg*, A. S. *secg*, 124

- Sedum, fr. *sedeo*, I act as a sedative, 648; S. acre, 649; S. album, 101, 649; S. anglicum, 649; S. sexangulare, 649; S. dasyphyllum, 650; S. forsterianum, 651; S. reflexum, 650; S. Rhodiola, 651; S. rupestre, 650; S. Telephium, 650; S. villosum, 650
- Seges, gen. *segetis*, growing corn.
- Selago (see Lycopodium Selago), so called because it was collected with solemnity, fr. *se* and *lego*, I collect, 163
- Self-heal, slough-heal, 434
- Semiamplexicaule, or amplexicaule, fr. *semi*, half, *amplexo*, I embrace, and *caulis*, the stem (Fig. 50, p. 17).
- Sempervivum, fr. *semper*, always, and *vivo*, I live, ever living or everlasting, 651; S. tectorum, 651
- Senebiera, in honour of a botanist, 716; S. coronopus, 716; S. didyma, 716
- Senecio, fr. *Senex*, on old man (bald-head, which the receptacles resemble when the flowers and fruit have fallen-off), 527; S. aquaticus, 529; S. erucifolius, 528; S. Jacobæa, 528; S. paludosus, 529; S. palustris, 528; S. saracenicus, a vulnery among the Saracens, 529; S. squaridus, 528; S. sylvaticus, 528; S. viscosus, 528; S. vulgaris, 527
- Sengreen, house-leek, periwinkle, 651
- Sepals, fr. *sepes*, a hedge, 23
- Septangularis, e, seven-angled.
- Septenate, fr. *septem*, seven, when seven leaves or leaflets grow from a common centre.
- Serrated, doubly, 14
- Serratula, fr. *serra*, a saw, 508; S. tinctoria, 508
- Serotinus, a, um, fr. *sero*, late.
- Service-tree, 54, 614, 615; wild, 616
- Seseli and Seselineæ, 589
- Sessleria and Sesslerieæ, named in honour of S. Sessler, an Italian botanist, 913 (*corrigere* Sessleria, p. 210); S. cœrulea, blue, fr. *cœlum*, heaven, 211
- Sessile, sitting, fr. *sedeo*, I sit, when the leaves are without petioles (leaf-stalks) they are called sessile, 11
- Setaceous, a, um, adj., fr. *seta*, a bristle, or hair, 4
- Setaria, fr. *seta*, a bristle, 194; S. glauca, fr. *glauca*, bluish, 195; S. italica, 195; S. verticillata, 195; S. viridis, 195
- Setterwort, 789
- Sheep's-bit, scabious, 498
- Shepherd's crook, Verbascum Thapsus, q. v., 458
- Shepherd's bodkin, or Shepherd's needle, 603; Shepherd's purse, or Shepherd's pouch, 715; Shepherd's rod, Dan. *gylden vund-urt* (golden woundwort), 553
- Sherardia, named in honour of W. Sherard, a patron of botanists, 559; S. arvensis, 559
- Shoreweed, Ger. *strandling*, 402
- Sibthorpia, *nomen memorabile* (see Authorities, p. xix.), 453; S. europæa, 454
- Signification of the names of species, &c., 125
- Silais, a name applied to some umbelliferous plant by Pliny, 593; S. pratensis 593
- Silene, fr. *σιαλον* and *σιελον* (?), fr. *σιαλιζω* and *σιαλος*, Ionic *σιελος*, what is moist or viscid, 761; S. acaulis, 764; S. *alpestris*, 764; S. anglica, 761; S. *Armeria*, 763; S. *catholica*, 763; S. conica, 763; S. inflata, 762; S. italica, 762; S. maritima, 763; S. noctiflora, 763; S. nutans, 762; S. Otites, fr. *ους*, an ear, an ear-pick, which the leaves resemble, 762; S. *paradoxa* or *patens*, 762
- Siliculose, fr. *silicula*, a little pouch, 706
- Silverweed, Dan. *gaase-urt* (goosewort), 54, 625
- Silybum, fr. *σιλυβος*, a thistle-kind of plant which bore eatable sprouts, 506; S. Marianum, Our Lady's thistle, 506
- Simethis, fr. *Simethis*, a Sicilian nymph (see Ovid's Met. xv.), 113, 298; S. bicolor, 298
- Simson or Groundsel, Dan. *kaars-urt*.
- Sinapis, fr. *σινάπ*, and fr. *Cel. nap*, a turnip or cabbage, or *ysniab ysnid* (?), a snout, in allusion to the beaked fruit, hence snipe, 703; S. alba, 703; S. arvensis, 703; S. Cheiranthus, 704; S. dissecta, 704; S. incana, 705; S. monensis, fr. *Mona insula* (Isle of Man), where the plant grows, 704; S. nigra, 705
- Sison, fr. *Cel. sizon*, a brook (?), fr. *σισων*, a Syrian plant or a medicinal seed (?), 584; S. Amomum, fr. *αμωμον*, the name of an odoriferous plant used in the process of embalming, hence mummy, that which has been embalmed, 584
- Sisymbrium, fr. *σισυμβριον*, a name given to some plant, 700; S. Alliaria, fr. *Allium*, a garlic-smelling plant, 700; S. *austriacum*, 701; S. *Columbae*, 701; S. Irio, fr. *iris*, party-coloured, 700; S. officinale, 700; S. *pannonicum*, 701; S. polycerarium, fr. *πολυς*, much, and *κερας*, a horn, in allusion to the numerous horn-like pods, 701; S. Sophia, 701; S. thalianum, fr. *θαλιος*, sprouting, fr. *θαλλος*, a sprout, 700
- Sit siccar, the Scottish name of Ranunculus repens.
- Sium, fr. *Cel. siw*, water, or fr. *σιεω*, I shake, *quia ab aquis sietatur*, 587. A plant strongly recommended by Pliny (Bohn's ed., vol. iv., bk. xxii., chap. 41). S. angustifolium, 587; S. latifolium, 587
- Skulleap, Dan. *feber-urt*, 434, 435
- Sloe, Dan. *slaaen-torn*, 618
- Smynrium, fr. *σμυρνα*, and *μυρρα* (?), Heb. *mara*, 605; S. Olusatrum, black-herb, Alexanders (a corruption of Olusatrum), 605
- Snake-root, *slange-urt*, Polygonum Bistorta, q. v., 374
- Snakeweed, 48, 374
- Snake-head, Dan. *slange-hoved*, 297
- Snapdragon, 447
- Sneezewort, Dan. *nyse-urt* or *nyse-krud* (nyse = sneeze), 513
- Snowdrop, 108, 325; Snow-flake, 326; Snow-plant, 66
- Sopawort, 761, Dan. *sæbe-urt*, 761
- Soboles, 7

- Solanaceæ, 10, 81, and Solanum, fr. *solanum*, comfort, fr. *sol*, the sun (P), 461; S. Dulcamara, 461; S. nigrum, 462; S. tuberosum, 6
- Solidago, fr. *solidor*, I unite, 524; S. Virgaurea, 524
- Solomon's seal, Dan. *Salomon's segl*.
- Sonchus, fr. *σογχος* (Ainsw. Pliny, xxii. 22), *σομφος* (P), (Linn. "Ph. Bot." 183), 538; S. arvensis, 539; S. asper, 539; S. oleraceus, 538; S. palustris, 539
- Sorbus, fr. *sorbum*, an apple, or the fruit of the sorb, so called *quia ejus succus sorbetur*, a potable substance is obtained from the fruit, 615; S. Aria, 616; S. Aucuparia, fr. *auceps*, a fowler, because its wood affords the implements of his craft, 615; S. terminalis, because the fruit has the reputation of causing the mulligrubs, 615; S. domestica, 615; S. scandica (Skandinavian), 616
- Sorrel, Dan. *suur-kaal* (sour-kale), 379, 382, 384
- Sorrel, wood, 753, 754
- Souracks, Scottice for Sorrel, 382
- Southernwood, 518
- Sowbane (Chenopod), 384
- Sow-bean, Dan. *sœ-bønne*, 463
- Sow-bread, It. *pan porcino*, Port. *pao de porco*, Swed. *svin-bröd*, 403
- Sow-thistle, W. Glos. *su-distel*, Dan. *svine-tidse*, 539, 540
- Sparganium, fr. *σπαργανον*, a band, in allusion to the riband-shaped leaves, 277; S. minimum, 277; S. natans, 277; S. ramosum, 277; S. simplex, 277
- Spartina, fr. Sp. *esparto*, a cord, some similar plant being used for cordage, 202; S. alterniflora, 202; S. stricta, 202
- Specularia, fr. *speculum*, a looking-glass, 498; S. hybrida, 498
- (The terminations *aria*, *aster*, *astrum*, *ella*, *ula*, like *oides*, signify a likeness to the plant whose name forms the first part of the word.)
- Speedwell, Ger. *ehrenpreis*, Dan. *arenprijs*, so named because of its sanative reputation, 49, 439, 444
- Spergula, and Spergularia, like a Spergula, a synonyme of Lepigonum, fr. *spargere*, to scatter, 767; S. arvensis, 767; S. pentandra, 767
- Sphærococcus, fr. *σφαῖρα*, a sphere, and *κοκκος*, fruit, in allusion to the globular fructification, 155
- Spicatus, a, um, fr. *spica*, a spike, spiked or bearing a spike.
- Spica-venti, fr. *spica*, spike, and *ventus*, wind; the panicle is easily moved.
- Spiguel, 593
- Spike, fr. *spica*, and Spikelet, fr. *spicula*, a little spike, 20, 21. (See Inflorescence.)
- Spindle-tree, Dan. *been-ved* (bone-wood), 55, 737
- Spinulosa, fr. *spina*, a spine.
- Spiræa, and Spirææ, fr. *σπειρα*, Theoph., 620; S. Filipendula, fr. *filum*, a thread, and *pendulus*, hanging, 621; S. salicifolia, 621; S. Ulmaria, fr. *ulmus* (*quod non inter ulmos crescit*).
- Spiralis, turning or winding like a screw.
- Spiranthes, fr. *σπειρα*, a spiral, and *ανθος*, 321; S. æstivalis, 321; S. autumnalis, 321; S. cernua, 321
- Spongioles, fr. *sponge*, 6
- Sporangia, Sporidia, Spore-cases, Spores, Sporules, fr. *σπορα*, sowing or seed, fr. *σπειρω*, I sow, 153. The reproductive matter of cellular or acotyledonous plants.
- Spurge, fr. *purgo*, I purge, 361. The species are violent cathartics.
- Spurrey, Dan. *knae-graes*, 767.
- Squalidus, a, um, inelegant.
- Squarrosus, rough, fr. *squarra* or *scarra*, roughness.
- Squinancy-wort, it cured the quinsy (P), 559
- St. Barnabas-thistle, or Star-thistle, 510; St. John's-wort, 730, 734; St. Stephen's-wort, Cirœa lutetiana, q. v., 611; St. Mary's-thistle, *labium veneris*, Silybum, 506; St. Peter's-wort, 731
- Stachydeæ, and Stachys, fr. *σταχυς*, a spike, 426, 431; S. annua, 432; S. arvensis, 432; S. Betonica, fr. *Vettones*, a nation in Spain, whose inhabitants discovered the quality of this herb, or fr. *ben*, good, 431; S. germanica, 431; S. palustris, 432; S. sylvatica, 431
- Staphylæa, fr. *σταφυλη*, a cluster, 738; S. pinnata, 738
- Starch, 39
- Starwort, 394, 581
- Starwort, sea, 724
- Statice, fr. *στο*, or *στασιζω*, poetic, for *ιστημι*, I stop; it was supposed to stop the flux, 404; S. Limonium, fr. *λειμων*, a meadow, 404; S. rariflora, 404; S. reticulata, 404; S. spathulata, 404
- Stellaria, fr. *stella*, a star, in allusion to the radiate petals, 772; S. glauca, 773; S. graminea, 773; S. Holostea, 56, 772; S. media, 772; S. nemorum, 772; S. uliginosa, 773
- Stellatus, a, um, and Stellaris, e, fr. *stella*, a star, the species have radiate leaves, 559
- Stellulatus, a, um, fr. *stellula*, a little star, starry.
- Stems, subterranean and aerial, 7
- Sticta pulmonacea, 159
- Stictocarpa, fr. *στικτος*, depressed, and *καρπος*, fruit.
- Stigma, fr. *στιγμα*, a point; is usually but not always the uppermost part of the pistil, 27
- Stipa, and Stipeæ, fr. *στιπη*, silky; *stippa*, flax and tow are from the same root, 193; S. pennata, 209
- Stipulate, with stipules, and Stipule, a leaf-like appendage to a leaf, usually at its base, or attached to its sides near the base, 17
- Stitchwort, Dan. *oeyen-tröst*, 772
- Stock, 693
- Stómata, fr. *στομα*, a mouth, 3, 4

- Stone-crop, 648, 650
 Stone-parsley, Dan. *steen-karse*, 592.
 Stork's-bill, Dan. *stoerke-naeb*, 751, 752
 Strapwort, 652, 653
 Stratiotes, fr. *στρατιωτης*, a soldier, 310; *S. aloides*, 311
 Strawberry, Dan. *jord-bær*, Ger. *erd-beere*, 621, 626. So called because straw is often laid between the rows, to prevent the fruit being spoiled by the rain. The common ancient name is Earthberry, because the fruit grows on the ground.
 Strawberry, barren, 53
 Strawberry-tree, 492
 Striatus, a, um, lined, veined, or streaked.
 Strictus, a, um, adj., straight.
 Strigosus, a, um, fr. *strigo*, lank, scraggy, meagre.
 Style, that part of the pistil which bears the stigma, 27
 Subularia, fr. Lat. *subula*, an awl, 716; *S. aquatica*, 716
 Subterraneus, a, um, under ground, fr. Lat. *sub*, under, and *terra*, the earth.
 Succory, 532
 Suffocatus, a, um, suffocated or choked.
 Suffruticose, fr. *sub* and *frutex*, a shrub, half-shrubby plants are so called.
 Sulcate is furrowed.
 Sulphurwort, Ger. *haar-strang* (hair-strings), sow-fennel, 596
 Sundew, Dan. *soel-dug* (sundew), 729, 730
 Supinus, a, um, lying on the back.
 Swallow-wort, Dan. *svale-urt*, 726
 Sweet-briar, 641
 Swine's-cress, Ger. *krahenfuss*, crow's-foot, 716
 Swine's-succory, 532
 Sycamore, 55, 739
 Sylvaticus, a, um, and Sylvestris, e, fr. *sylva*, a wood or grove; the first means a woodland plant, the second a wild plant.
 Sylvestral plants, 71
 Symphytum, fr. *συμφυω*, I unite, the species were reputed vulneraries, 466; *S. officinale*, 466; *S. tuberosum*, 466
 Syncarpa, fr. *συν*, and *καρπος*, with combined carpels.
 Syncarpous, fr. *συν*, together or combined, and *καρπος*, fruit, 30
 Systyla, united styles, fr. *συν* and *στυλος*.
 Tamarix, Tamaricaceæ, and Tamaricaceæ, 777; *T. anglica*, 777
 Tamus, fr. *tamnus*, a wild vine, Pliny, 331; *T. communis*, 332
 Tanacetum, fr. *θανασια*, a, not, and *θανατος*, death, "no cure for death," 518; *T. vulgare*, 519
 Tangle, fr. the same root as *tongs*, fr. A. S. *tang*, forceps, because it lays hold on the rocks on which it grows, 155
 Tare, 540
 Tansy, Dan. *reinfan*, Ger. *rainfarn*, so called because it grows on banks, *rein*, and has leaves like a fern, 519
 Taxinæ, and Taxus, fr. *ταφος* (Diosc. iii. 78), 332; *T. baccata*, fr. *bacca*, a berry, 334
 Taxonomy, 131
 Teasel, fr. *tease*, to separate, Dut. *karden-distel* = *vollers kaarden*, Sp. *cardencho*, Dan. *karde-tidse* (card-thistle), 552
 Technicalities, 114, 120, 126, 130
 Tectorum, of roofs, fr. *tectum*, a roof.
 Teesdalia, in honour of R. Teesdale, a Yorkshire botanist, 711; *T. nudicaulis*, 711
 Telephium, fr. *Telephus*, the son of Hercules, who discovered its virtues.
 Temulentus, a, um, what causes ebriety, fr. *tementum*, το μεθν, quod teneat mentem, 602
 Tendril, a twisted, thread-like process, 18
 Tenellus, a, um, fr. Lat. *tenuis*, slender.
 Tentwort, white maidenhair, *Asplenium ruta muraria*.
 Tenuis, e, thin, fine, small, *fortasse a teneo, quia tenuia facile teneantur*.
 Tenuissima, us, um, sup. deg., very thin.
 Tereine, 23.
 Teretiuseula, somewhat tapering, fr. *teres*, round and tapering.
 Terrestis, e, fr. *terra*, growing on the ground.
 Tetragonum, fr. *τεσσαρος*, four, and *γωνν*, an angle, four-angled.
 Tetragynous, having four pistils, fr. *τεσσαρος* and *γωνν*, pistil, 70
 Tetrabit, fr. *τεταρτος*, Epic form, *τετρατος*, having four angles.
 Tetrasepalous, Tetrapetalous, Tetrandrous, and Tetraspermum, fr. *τεσσαρος*, four, having four sepals, four petals, four stamens, 70
 Teucricum, fr. *Teucer*, a royal Trojan medical botanist, 436; *T. Botrys*, fr. *βοτρυς*, a cluster, 437; *T. Chamædrys*, fr. *χαμαι*, on the ground, and *δρυς*, oak, ground-oak, 437; *T. Scordium*, fr. *σκορδον*, a leek, which it is thought to savour, 437; *T. scorodonia*, fr. the same (?), 436
 Thalamus, Gr., or fr. Lat. *torus*, where the axis of growth ends, and where the flower or flowers are situated, 20
 Thalianus, a, um, fr. *Thalia* (?), one of the Graces, named per antiphrasin, because it has no beauty.
 Thaliectum, fr. *θαλλω*, I am green, or I flourish, 780; *T. alpinum*, 781; *T. flavum*, 781; *T. fluviuosum*, 781; *T. minus*, 781; *T. saxatile*, 781
 Thallogens, fr. *θαλλος*, a sprout, and *γινεται*, is produced, plants in which the root, stem, and leaves are not distinguished; a synonyme of *Amphigens*, q. v., 153
 Thallophytes, fr. *θαλλος* and *φνειν*, to produce, a synonyme of *Thallogens*, 153
 Theca, and Thecaphore, a spore, or spore-case, fr. *theca*, a pouch.
 Thapsus, fr. the island *Thapsus* (?); και μεν χρωσ μεν ομοιος γινετο πολλακι θαψω (Theocrit. ii. 88). Disappointed love threw the poet into the yellow jaundice, or coloured his skin like the *Thapsus*.
 Thesium, named in honour of *Theseus*, the mythic Grecian hero, 396; *T. humifusum*, 397

- Thlaspi, fr. *θλασω*, I flatten (flat pouches), 712; *T. alpestre*, 712; *T. arvense*, 712; *T. perfoliatum*, 712
 Thief-thorn, ancient glossary, *thife-thorn* (Rhamnus), Christ's-thorn.
 Thistle, Dan. *tidsel*, Ger. *distil*, 504, 506
 Thorn, Dan. *thorn*, 17; 18
 Thorn-apple, 101, 463
 Thorow-wax, 582
 Thrift, Dan. *bierg-nellike* (mountain-pink), 402, 403
 Thrinia, fr. *θρινκος*, a feather, 534; *T. hirta*, 534
 Thyme, fr. Lat. *thymus*, and *θυμος*, 423
 Thymeliaceæ, fr. *θυμος*, thyme.
 Thymoides and Thymus, fr. *θυμος*, 422, 423; *T. Serpyllum*, fr. Lat. *serpens*, creeping, 423; *T. vulgaris*, 423. (See Appendix.)
 Tilia, and Tiliaceæ, fr. *πυλον*, or *τυλαι*, light substances, 741; *T. europæa*, 741, 742; *T. grandifolia*, 742; *T. microphylla*, 742; *T. parvifolia*, 742; *T. platyphylla*, 743; *T. americana*, 743
 Tillæa, named to commemorate M. A. Tili, an Italian botanist and author, 651; *T. muscosa*, 652
 Tissue, conducting, 28
 Toadflax, Dan. *torsk-mund* (haddock-mouth), 447, 450
 Toffieldia, so called in honour of Mr. Tofield, a Yorkshire patron of botanists, 295; *T. palustris*, 295
 Tomentosus, a, um, *τομος*, fr. *τεμνο*, I cut or shave, what may be cut off.
 Toothed (dentate), serrate or serrated, fr. *serra*, a saw, 14
 Toothwort, Dan. *tand-urt*, 457, 695
 Tordylium, fr. *τορδύλιον*, the name given to some umbelliferous plant, fr. Cel. *turn*, a wheel, and Gr. *τοπος*, and Lat. *tornus*, because the fruit is like some things made by the turner's art; *T. maximum*, 598; *T. officinale*, 598. (Corrige Tardylium, 596).
 Tormentil, Dan. *bloed-roed* (red), 622
 Torilis, fr. *τορευω*, I carve, or turn, in allusion to the carved-like seeds (see Tordylium), 600; *T. Anthriscus*, fr. *ανθρυσκον* (P), 601; *T. infesta*, 601; *T. nodosa*, 601
 Torus, Lat., a couch, 20, 120
 Tracheæ, tissues, fr. *trachea*, the windpipe, 2, 38
 Tragopogon, fr. *τραγος* and *πωγων*, goat's-beard, 537; *T. porrifolius* (leek-leaved), 537; *T. pratensis*, 537
 Transverse, across, 18
 Translucens, fr. *translucet*, the light passes through.
 Traveller's-joy, 780—
 * "The Traveller's-joy,
 Most beauteous when its flowers assume
 Their autumn form of feathery plume:
 The Traveller's-joy, name well bestowed
 On that wild plant." * * *
 Viorna quasi via ornata (ornament of the wayside).
 Treacle-mustard, 699
 Trefoil, 668, 673
 Tremulus, a, um, fr. *tremo*, I quiver.
 Trichoides, fr. *τριξ*, *τριχος*, a hair, and *ειδω*, I resemble.
 Trichomanes, fr. *τριξ*, hair, *μανια*, excess, 189; *T. radicans*, fr. *radix*, a root, 189
 Trichonema, fr. *τριξ*, a hair, and *νημα*, a filament, 330; *T. Columnæ*, *Columnas*, 330
 Tricôlôr, three-coloured.
 Tricornis, e, three-horned.
 Trientalis, fr. *triens*, in fours, 409; *T. europæa*, 410
 Trifidus, a, um, three-cleft.
 Trifoliatum, a, um, three-leaved.
 Trifolium, fr. *tres*, three, and *folium*, a leaf, 668; *T. arvense*, 670; *T. Bocconi*, 671; *T. filiforme*, 668; *T. fragiferum*, 673; *T. glomeratum*, 671; *T. maritimum*, 671; *T. medium*, 669; *T. minus*, 668; *T. ochroleucum*, 669; *T. ornithopodioides*, 672; *T. pratense*, 669; *T. procumbens*, 668; *T. repens*, 672; *T. resupinatum*, 673; *T. scabrum*, 671; *T. stellatum*, 670; *T. striatum*, 670; *T. subterraneum*, 671; *T. suffocatum*, 672
 Triflorus, a, um, three-flowered.
 Triglochin, fr. *τρεις*, three, and *γλωχης*, a point, three-pointed, 290; *T. maritimum*, 290; *T. palustre*, 290
 Triglumis, e, with three glumes.
 Trilliaceæ, fr. *Trillium*, 131, 308
 Trinia, named in honour of C. B. Trinius, a Russian botanist, 583; *T. glaberrima*, 583
 Triodia, fr. *τρης*, and *οδους*, tooth, 212. (See Danthonia).
 Triphyllus, fr. *τρι*, and *φυλλον*, a leaf, three-leaved.
 Tripinnate, thrice-pinnated, 16
 Triquetter, quetra, um, four-angled or sided.
 Triticeæ and Triticum, fr. *tero*, I bruise, because its produce is ground into flour, 193, 234; *T. caninum*, 235; *T. cristatum*, 235; *T. junceum*, 235; *T. laxum*, 235; *T. repens*, 234; *T. sativum*, 235
 Trivialis, e, belonging to *trivium*, a place where three ways meet. Trivial names, although applied as specific names, usually describe some *accident* of the plant, as the duration, locality, native country, &c.; specific names, properly so called, describe some *quality* of the plant.
 Trollius, fr. Ger. *trolen*, a ball; Trollblume, Dan. *trol-bloemster*, 788; *T. europæus*, 788
 True-love is Paris, Dan. *ulfs-baer*, or *fire-blad* (four-leaf), 308
 Trunk or truncus, 7
 Tuberosus, a, um, tuberous.
 Tuber, truffle, a genus of exquisitely delicate fungi, fr. *tumet*, it swells, or fr. Heb., *tuber*, *umbilicus*, 156
 Tubuliflore, fr. *tuba*, a tube, and *flos*, a flower, 502
 Tufted or fasciculate, 17
 Tulipa and Tulipeæ, fr. Per. *toliban*, turban, 296; *T. sylvestris*, 296
 Tun-hoof is Ale-hoof.
 Turbinate, fr. *turbo*, a top, top-shaped, 24

- Turgenia, fr. *turgeo*, I swell, 600; T. latifolia, 600
 Turnip, Dan. *Roe*, *vild-kaal*, 702
 Turritis, fr. *turris*, a tower, 698; T. glabra, 698
 Tussilago, fr. *tussis*, a cough, 530; T. Farfara, fr. *far*, corn (?), among which it grows, or fr. *φαρμα*, I plough, because the land is ploughed for corn, 530
 Tutsan, fr. Fr. *tout-sain*, all-heal, 730, 733
 Twayblade, Dan. *tolblad*, 322
 Typha and Typhaceæ, fr. *τυφος*, a marsh where the plants grow, 275; T. angustifolia, 276; T. latifolia, 276
 Ulex, fr. Cel. *ec* or *ac*, a sharp point, 659; U. europæus, 659; U. Gallii, 660; U. nanus, 660
 Uliginosa, fr. *uligo*, *uliginis*, moist oozy parts, "humus dulci uligine læta."
 Ulmaceæ and Ulmus, fr. *elm*, its name in the Teutonic and Celtic languages, 371; U. campestris, 371; U. montana, 372
 Umbel, when the flower-stalks radiate from a common centre, the inflorescence is called umbellate, 22
 Umbellule and umbellets, when there is a second series of umbels at the end of the first, 22; fr. *umbra*, a shade, and "umbella, a little round thing that gentlewomen bore in their hands to shadow them."—Cooper's Thes. *sub voce*.
 Umbelliferæ, fr. *umbel*, and *fero*, I bear, 23, 24, 33, 71, 77, 81, 83, 89, 90, 578, 579; U. imperfectæ, 579
 Umbelicus, fr. *ομφαλικος*, the navel.
 Umbrosus, a, um, fr. *umbra*, a shade; growing in shady places.
 Undulatus, a, um, wavy or crisp, fr. *unda*, a wave.
 Urbicus, a, um, growing near dwellings, fr. *urbs*, a city.
 Uredo, pl. Uredines, the name of a genus of fungi, fr. *uro*, I burn, the plants on which they appear having a burnt appearance, 156
 Ursinus, a, um, fr. *ursus* and *ursa*, a bear.
 Urtica and Urticaceæ, fr. *uro*, I burn; U. dioica, 368; U. pilulifera, 368; U. urens, 368; U. Dodartii, 369
 Usitatissimus, a, um, *sup.*, very common or usual.
 Ustulatus, a, um, fr. *uro*, I burn, having a scorched appearance.
 Utricularia, fr. *utriculus*, a little bottle, in allusion to the air-bladders which help to float the plants, 414; U. intermedia, 414; U. minor, 414; U. vulgaris, 414
 Vacciniaceæ and Vaccinium, fr. *bacca*, a berry, or *vacca*, a cow (?), one of the species is named cow-berry, 493; V. Myrtillus, 494; V. Oxycoccus, fr. *οξυς*, acid, and *κοκκος*, a berry, 495; V. uliginosum, 494; V. Vitis-idaea, 494. *Alba liqustra cadunt nigra vaccinia leguntur*.
 Vagans, wandering.
 Valerian, Ger. and Dan. *baldrian*, 555; Valerian family, 555, 556
 Valeriana and Valerianaceæ, fr. *valeo*, 33, 52, 70, 71, 555; V. dioica, 556; V. officinalis, 556; V. pyrenaica, 556
 Valerianella, this small group of plants has borne three names within the space of a not very long life, viz., *Valeriana*, *Fedia*, and *Valerianella*, 557; V. Auricula, 557; V. carinata, 557; V. dentata, 557; V. eriocarpa, 558; V. olitoria, 557
 Valvate, having a valve, 18
 Varieties, 99
 Vascular, adj., or vasculars, s., fr. *vas*, a vessel, plants that have vascular as well as cellular tissue are so called, 116, 153
 Vascular tissue, cellular tissue, 2
 Vasiform, 38
 Vegetable acids, 39
 Vegetable physiology, 35
 Vella, fr. Cel. *veler*, cress, or fr. *vello*, I bite, pinch, or pull, *ελω*, 711; V. annua, 103, 711. The Gauls call Iris or Erysimum *vela* (Pliny, 44, 53, Bohn's ed.)
 Venus' looking-glass, 498
 Verbascaceæ and Verbascum, fr. *barba*, a beard, 457, 458; V. Blattaria, fr. *blatta*, cock-roach, 460; V. floccosum, (woolly), 459; V. Lychnitis, fr. *λυχνος*, a light, the plant affords wicks, 459; V. nigrum, 459; V. pulverulentum, 459; V. thapsiforme, 459; V. Thapsus, fr. *θαψια*, or *θαψος*, insula, 458; V. virgatum, 460
 Verbascum, *konigs kerze*, royal taper.
 Verbena and Verbenaceæ, *herbena*, *herba*, herb (?), 415. An herb; the herb *par excellence*. V. officinalis, 21, 416.
 Etymon? *Herba bona*, or Cel. *ben*, good; Berberia, A. S. *berbure*. Origin very uncertain.
 Vernalis and Vernus, a, um, fr. *ver*, the spring, spring flowers.
 Versicolor, changing colour, like some of the *Myosotes*.
 Verum, true.
 Ventral, fr. *venter*, the bag, 29
 Veronica (etymon. new ?), (*verus-unicus*), *veiko*, I excel, 439; V. agrestis, 439; V. alpina, 442; V. Anagallis, 444; V. arvensis, 441; V. Beccabunga, a Latin corruption of Ger. *bachebunga*, brookbean or brooklime, 444; V. Buxbaumii, Buxbaum, a botanist, 440; V. Chamædrys, fr. *χαμαι*, on the ground, and *δρυς*, oak-leaved, 443; V. fruticulosa, 442; V. hederæfolia, 439; V. hirsuta, 443; V. hybrida, 442; V. montana, 443; V. officinalis, 442; V. peregrina, 444; V. saxatilis, 442; V. scutellata, 443; V. serpyllifolia, 441; V. spicata, 441; V. triphyllus, 440; V. verna, 440
 Verticillate, in a radiate manner, 17
 Verticillatus, a, um, *vertere*, to turn.
 Vervain, or holy herb, Verbena, *ιεροβοτανη*, sacred herb, *herba bona*—"place the vervain on the altar," 419
 Vesicaria, fr. *vesica*, a bladder.
 Vetch, fr. Lat. *vicia*, 675, 679; climbing, 54; wood, 54
 Vetchling, 679, 681, 682
 Vexillum, Lat., a standard, 25

- Viatical plants, fr. *via*, a way, 85
 Viburnum, fr. *vico*, I bind, 564; V. *Lantana*, fr. *lentus*, flexible, 564; V. *Opulus*, 565
 Vicia, fr. Cel. *guig*, Ger. *wicke*, Fr. *vesce*, Gr. *Bux*, Dan. *vikker*, 675; V. *bithynica*, 676; V. *Cracca*, crack-vetch, Ger. *krache*, Belg. *crack*, 677; V. *Gerardi*, 677; V. *gracilis*, 678; V. *hirsuta*, 678; V. *hybrida*, 676; V. *lathyroides*, 675; V. *lævigata*, 676; V. *lutea*, 676; V. *Orob*, fr. *opo*, I strengthen, and *Sous*, an ox, 679; V. *tenuifolia*, 677; V. *tetrasperma*, 678; V. *sativa* (Fitchacks), 675; V. *sepium*, 676; V. *sylvatica*, 679; V. *villosa*, 677.
 Villarsia, fr. Villars, a distinguished French botanist, who published a Flora of Dauphiné, 50, 479; V. *nymphaeoides*, 479
 Villosus, a, um, hairy.
 Viminalis, fr. *vimen*, a twig, slender and flexible.
 Vinca, fr. *vincio*, I bind, 50, 484; V. *major*, 484; V. *minor*, 484
 Vinealis, e, fr. *vitis*, a vine, growing in a vineyard.
 Viola and Violaceæ, fr. *via*, a way, because it grows by roadsides (?), 33, 685; V. *arvensis*, 688; V. *canina*, 687; V. *hirta*, 687; V. *lactea*, 688; V. *lutea*, 688; V. *odorata*, 686; V. *palustris*, 686; V. *stagnina*, 688; V. *sylvestris*, 687; V. *tricolor*, 688
 Violaceum, violet-coloured.
 Violet, 18, 685—689
 Viper's bugloss, 471
 Virgin's bower, Ger. *wald rebe*, 780
 Viridis, e, adj., green, fr. *ver*, spring, when vegetation is green.
 Virosus, a, um, poisonous, venomous, fr. Lat. *virus*, poison.
 Viscosus, a, um, viscid.
 Visum, fr. *oxus*, *quia vis ei magna*, 571; V. *album*, 571
 Vitellina, fr. *vitellus*, yellow, like the yolk of an egg.
 Viviparus, a, um, fr. *vivus* and *pario*, producing young alive, among animals, and by bulbs, &c., among plants.
 Volatile oils, 39
 Voluble, fr. *volvo*, I twine, 8
 Vulpina, fr. *vulpes*, a fox, fox-coloured (?).
 Vulgaris, e, and Vulgatus, a, um, very common.
 Vulneraria, fr. *vulnus*, a wound, a vulnerary or wound-curing plant.
 Wahlenbergia, 498. The plant, handsome though it be, is honoured in bearing this honoured name. W. *hederacea*, 498
 Wallflower, Ger. *lack*, 692
 Wandsworth, 102
 Wart-cress, 716
 Wartwort, Dan. *vorte-urt*, 361, 365
 Water aloe, 311; Water avens, 639; Water betony (Water figwort), 445; Water dropwort, 589, 591, 592; Water germander, 437; Water hemlock (Cowbane), 584, 591; Water milfoil, 7, 53, 407, 606; Water parsnep, 53, 587; Water purslane, 655, 656, 657; Water violet, 407; Waterwort, 754, 755
 Waybread, O. Ger. *wegapreita*, M. Ger. *wegebroid* (Phyt. N. S. i. pp. 12, 13, 14).
 Way bennet, *Hordeum murinum*, 236
 Wayfaring-tree, *varende bom*, 564
 Weld is *Reseda*, q. v., 728
 Whin, 659. This plant is not in Müller's "Danish Flora."
 White campion, 57, 764; White rot (sheep's rot), 579, 580; White thorn, Dan. *hvid torv*, 54, 613
 Whitlow grass, 707, 708
 Wild cabbage, Dan. *vild kaal*, 702
 Wilding crab, Dan. *skov-able*, 614
 Willow, 37, 105, 123, 335, 350
 Willow-herb, 607, 610, 656
 Wind flower, Dan. *axe-oere*, 782
 Winter aconite, 789; Winter cress, Dan. *vinter-kaarsee*, 694; Winter green, 735, 736. Winter's greens is a mistake for Winter greens, 50
 Witchweed and Witchwort is Enchanter's nightshade, Dan. *St. Stephen's-urt*, 611
 Withering, Dr., Botanical arrangement, 97
 Woad, Ger. *waid*, 659, 717; Woad-waxen, 659
 Wolf's-bane, the roots are used to poison wolves, 790
 Wolf's-milk, Dan. *ulve-milk*, Ger. *wolf's-milch*.
 Wood anemone, 55, 782; Wood betony, 431; Wood chervil, *wudu cerfille* (wild chervil), 602; Wood crowfoot, 57, 785; Wood-ruff, 559, 560; Wood sage, 40, 436; Wood sorrel (Alleluia), 55; Woody fibre, 39; Wood violet, 55; Woody nightshade, Dan. *hundebær*, 50
 Woodsia, named in honour of Joseph Woods, F.L.S., 182; W. *ilvensis*, 182; W. *hyperborea*, 182
 Wormseed (Erysimum), 699; Wormwood, 7, 518; Wormwort, Dan., *Scrophularia nodosa*, 445, 536
 Woundwort, 431
 Xanthium, fr. *ξανθος*, yellow, 552; X. *strumarium*, fr. *struma*, a scrofulous swelling, 552
 Yam, 331
 Yarrow, A. S. *gearwe*, 512
 Yellow-rattle, 450
 Yellow-wort, 483
 Yew or Yugh, 37, 332, 334. Yew was anciently used to adorn the dwellings of England's gentry and yeomanry, as Herick beautifully sings—
 "When yew is out, the birch comes in,
 And many flowers beside,
 Both of a fresh and fragrant kind,
 To honour Whitsuntide."
 Zannichellia, fr. Zannichel, an Italian botanist, 288; Z. *palustris*, 288
 Zostera, fr. *ζωστρη*, a riband or girdle, which the leaves only slightly resemble, 281; Z. *marina*, 282; Z. *nana*, 282
 Zosteraceæ, 281

ADDENDA.

ABELE, from the German, *albele*, a white poplar, also from the Dutch, *abeel*, the same; evidently derived from *albus*, white, which is the colour of the under side of the leaves. The French name is *aubeau*, also *peuplier blanc*. *Aube* is *alb*; *aube de pretre*, a priest's alb, or white garment in which a priest ministers; *aube de jour*, daybreak, &c. Some say *Abele* is from *Arbela*, near the Euphrates, where many of these trees grew.

Absinthion, or **Absinthium**, fr. *αψινθιον* (?), so called *quasi αψινθιον*, *impotabile propter insigne amarorem* (bitterness).

Acanthium, **Acanthus-like** (?), fr. *ακη*, top, and *αθος*, flower.

Aconite, winter, 789—

* * * "Winter Aconite,
Its butter-cup-like flowers that shut at
night,

With green leaf furling round its cup of
gold."—Clare.

Acorn, fr. A. S. *æc*, oak, and *corn*, grain, hence kernel.

Adonis, fr. Heb. *adon*, a lord, hence *don* in Spanish and *dan* in Old English.

Alder—

"O'er the dark pond * * *
The rigid alder its stiff image throws
Gloomy and sad." * * *

In Index, p. 803, "berry-bearing" should
be cancelled.

Alehoof, fr. A. S. *aloth*, and *hof*, ale and hoof; so called because the leaves, which bear some resemblance to a hoof, were used in the middle ages to clarify ale.

Alsine, fr. *αλη* (?), a grove, because some of the species grow in shady places.

Amaranthus, male scribitur per *th* (*Amarantus*), see 803.

Angelica, a legendary name; a certain king was admonished by an angel to use this plant to stay the plague raging in his army.

Aphanes, fr. *a*, not, and *φανω*, I appear; inconspicuous.

Arbutus, fr. Cel. *ar*, rough, and *boise*, a bush.

Arenaria—

"Among the loose and arid sands
The humble *arenaria* creeps;
Slowly the purple star expands,
But soon within its calyx sleeps."
A. Strickland.

Arundo, Lat. *reed*. Ainsworth says the name is from *arendo*, because it soon withers. *Pace* this learned man, it appears rather to be from *arens*, thirsty, because it loves water; hence *arena*, sand, which soaks up water, and is never soaked.

Asarabacca, fr. *asarum*, q. v., and *baccharis*. It was originally known by both names,

and was named *asarabacca* to distinguish it from the true *baccharis*.

Aspen, fr. Ger. *espe* (?). The tree was probably introduced from the Continent.

"O woman! in our hour of ease,
Uncertain, coy, and hard to please,
And variable as the shade,
By the light quivering *aspen* made;
When pain or sickness rends the brow,
A ministering angel thou."—Scott.

* * * "Not a breath
Is heard to quiver thro' the closing wood,
Or rustling turn the many twinkling leaves
Of *aspen* tall."—Thomson.

Atriplex, said by some to be derived from *a*, privative, and *τρεφω*, I nourish; by antiphrasis, because the species affords no nourishment.

Atropa, fr. *a*, not, and *τροπω*, I turn, inflexible. A name indicative of the inevitable fate of such as become subject to its influence. *Belladonna*, because once employed as a cosmetic by the Italian ladies. An overdose of the plant produces delirium, fury, and death; hence the names *maniacum*, *furiosum*, and *lethale*, poisonous, narcotic, acrid, &c. When it enters into the circulation, it acts on the heart, brain, and alimentary canal.

"Or have we eaten of the insane root
That takes the reason prisoner?"

It has been recommended as a preventive against scarlet fever. "*Atropa belladonna* furnishes an important medicinal preparation, one of whose most remarkable and useful effects is dilatation of the pupil. Perhaps one of the most protracted instances of this effect has occurred to the writer of these remarks, who was, some years ago, consulted by an individual in whom one eye was blind, while in the other vision was so impaired that he only saw when under the effect of *belladonna*, as light only then could reach the optic nerve. For the uncommon space of six or seven years this influence was in a great measure continued, though latterly, I understand, the indulgence was reserved for fairs and feasts, and other remarkable occasions. An English opium-eater, I recollect, speaks of carrying happiness in his waistcoat pocket; and in the same way the individual referred to might well consider vision in the light of a portable commodity." (From Murray's "Northern Flora," p. 143.)

Avens, from Cel. *afon*, water, some of the species grow near water. In "*Franche Compté*," the Osier is named *avon*, because it grows by rivers (*aven* = river).

Bardana, fr. It. *barda*, a horse-cloth, because the leaves are large! Forte a *barduc*, hebes; vel quasi Dardana, secundum Apuleium C. 36. A Dardano mago. Beech, Dan. *bøg*, Ger. *buche*, hence *buch*, a book, because the ancient Germans carved letters, or wrote, on beech trees. The Latin, *liber*, a book, is also derived from *liber*, the inner bark, because the ancients wrote on this substance.

"No wars did men molest
When only *beechen* bowls were in request."
Tibullus.

Berberis and Berberi, fr. Phoen. *barar*. Blechnum, fr. *βλαξ*, stultus. Spicant is derived from *spica nardi* or *spica indica*. (See Gesner, "Hort. Ger." p. 265.)

Blechnum, Gr. *βληχρος*, or *βλαχρος*, the name of some plant (β), fr. *βλαξ*, soft, and hence, by antiphrasis, the English name, *hard fern*.

Borage, said to be put for *corage* (*cor* and *ago*); an exciting drink was made from it. Pliny says, "if the leaves and flowers of *borage* be put into wine, and that wine drunken, it driveth away all heavy sadness and dull melancholy." Burton, in his "Anatomy of Melancholy," also says:—

"Borage and hellebore fill two scenes:
Sovereign plants to purge the veins
Of melancholy, and cheer the heart
Of those black fumes which make it smart."

Bourtree (elder), *borette*, Skinner (?), because its young shoots are hollow. A writer in the statistical account of Kilmearn, Stirlingshire, says—"it is no stranger in many places of the parish. * * * The branches cause an agreeable shade, hence the propriety of the name, *bower-tree* (bourtree)." Jamieson says—"This shrub was supposed to possess great virtue in warding off the force of charms and witchcraft. Hence it was a custom to plant it round country houses and barn-yards."

Cardamine is said to be derived from *καρδια*, the heart, and *δαμαω*, I tame. Only botanical etymologists construe this verb, "I strengthen." They produce no examples of *δαμαω* in this sense. The English verb, *to tame*, is connected with the Greek both in sound and sense. There is also a Greek proverb founded on this plant—*Καρδαμον βλέπειν*, *to look sour*.

Celandine, Lesser—

* * * "The first gilt thing
That wears the trembling pearls of spring."

There is a flower, the Lesser Celandine,
That shrinks, like many more, from cold
and rain,

And the first moment that the sun may
shine,
Bright as the sun himself is out again."

Wordsworth.

Clematis—

"Ellen's hand had taught to twine
The Ivy and Idæan vine,
The Clematis, the favoured flower,
Which boasts the name of virgin's
bower."—Scott.

Clote—

"This is the *clote* (*galium cruc.*?) bearing a
yellow flower;
And this black horebound, both are very
good
For sheep or shepherd, bitten by a wood
(mad)

Dog's envenomed tooth."—Drayton.

Cucubalus quasi *κακοβουλος*, i. e., cuius malum est consilium, quia malefica est. *Kakos*, *malum*; *bolos*, *jaciens*. (Beckmann, "Lex. Bot.," 8vo, 1801.)

Cymbalaria, quia folia figuram partium in Cymbalo resonantium.

Cynara, a *κυων*, *canis*, quia spinæ quodam modo canis dentes acutos referunt.

Daisy. The learned in Greek lore say this name is from *δαίζω*, I divide; others seek a humbler derivation in *day's eye*.

"Lenten (lent) ys come with love to tonne
(town),

With blosmen (blossoms) and with brid-
des ronne (song),

That all this blisse bryngeth.

Dayes ezes (daisies) in this dales;

Notes suete of nightingales,

Uch (each) foul songe singeth."

"Under the Hawthorn and the Poplar tree
The humble florets all delight to be;
The Primrose and the purple Hyacinth,
The dainty Violet and the wholesome
Minthe,

The double Daisy and the Cowslip, queen
Of vernal flowers do overpeer the green."
G. Peele, 1584.

Elder. The elder, the laurel, the mountain-ash, the rue, the piony, &c., were planted in the gardens and around the dwellings of our progenitors as bulwarks against the attacks of demons, to whom these plants were intolerable.

Erica, fr. *ερεικη*, a name applied by the Greeks to a much taller plant than our common heath, but probably not so tall as the modern *Erica arborea*, which in the Isle of Teneriffe reaches the enormous height of forty feet. (See "Phytologist," and "Proceedings of the Linnæan Society" for 1856. Compare "Theocritus," Ec. v. line 64, where one of the shepherds counsels the other to call the woodcutter, who cleft the *Ericas*, heaths.) The European heaths of the present day are not timber-trees, and are never cleft for fire-wood, nor for other purposes. This may help to determine the derivation of *Hypericum*; *υπο*, under, and *ερεικη*, or *ερικη*, fr. *ερεικω*, frango. The species of the modern genus *Hypericum* are comparatively humble plants, and might truly be described as being inferior

to such shrubs and trees as were submitted to the axe and splitting saw of the wood-cutter. According to Linnæus, fr. *ὑπερ εικων, imago super.* (Linn. "Ph. Bot.") De Theis says, Linnaeus should have told us what figure it is. "Car il ne pas facile de diviner."

Esula, εζουλα, eatable, because among the sweetest of the Euphorbias. Beckmann is credited with this notable reason of the etymon.

Globe-flower, or Lucken-gowan—

'By Billy-burn, in the langsyne days,
The globe-flower oft I have plucked
with thee,
Or wandered about on the mossy braes,
Chasing the dragon-fly and wild red
bee."—Anon.

Gowan—

"Yon guarded roses glowin',
It's wha daur mint to pu'?
But aye the wee bit gowan
Ilk reckless hand may strew."

"While on burn banks the yellow gowan
(*caltha pal.*) grows,
Or wandering lambs rin bleating after
ewes,
His fame shall last."—Ramsay.

Lily of the Valley. "In Norway," Inghs writes, "it stood everywhere around, scenting the air, and in such profusion, that it was scarcely possible to step without bruising the tender stalks and blossoms." This author adds, "I have not seen this flower mentioned in any enumeration of Norwegian plants, but it grows in all the western parts, in Lat. 59° and 60°, wherever the ground is free from forest, in greater abundance than any other wild flower." Our author evidently did not consult the best authorities.

"Fair flower! than whom the vernal gale
None fairer wakes on bank or spray;
Our England's Lily of the May,
Our Lily of the Vale."

Martagon (Lilium), Mathiol. in Diosc., pp. 600, 601, auctor est, herbam ita a chemistis esse nominatam; quid autem sibi voluerint chemistæ cum hac liliorum specie, atque unde ipsi nomen deduxerint, ignoro. (Beckmann, pp. 137, 138.)

Martagon. Questo nome orientale è stato dato dal Loebelio, dal Clusio e da altri a diverse specie di gigli; ma è rimasto più specialmente al *Lilium Martagon* dei botanici che ha i petali riflessi e curvati infuori. ("Dizionario delle Scienze Nat.")

Martagon, a figura floris Cymbalum vocat Laurenberg, App. p. 86.

Meum, fr. μειων, minuo, because its leaflets are attenuated!

Mistletoe, mistel is fr. Ger. mist, A. S. *mixen, dung.*

"The damsel donned her kirtle sheen,
The hall was dressed with holly green;
Forth to the wood did merry men go
To gather in the mistletoe."

"There, where the spreading consecrated
boughs

Fed the sage mistletoe, the holy Druids
Lay rapt in moral musings."

Mason.

Myrica, Gr. μυρω, I flow(?), because the species grow in watery places; or rather fr. μυρω, I cast a pleasant scent. Some of the species are odoriferous. Our British plant is called the bog-myrtle.

Nissolia, fr. W. Nissolle, a French botanist, author of a "Memoir sur les Plantes Cryptogames."

Phyllodoce, a poetic name, one of the nymphs.

Potentilla reptans—

"Oh, for a faith like thine,
Thou lovely creeper, that dost humbly
twine
O'er the waste places by our dusty ways;
Content, * * * serenely still,
In His world-temple one small niche to
fill.

* * * * *
In His world-choir to raise one simple
strain,

Assured * * * * *
Thee, too, He made, who nothing made
in vain."

Setewale = Valerian—

"Fykes, reisyn, dates,
Almaundrys, pomme-garnates,
Kanel and setewale."

Guy of Warwicke.

Spicant (Osmunda). Nomen in Germania corruptum e *spica nardi* sen *spica indicæ*. Videntur majores Osmundæ hocce nomen indidisse quod ejus radices ad similitudinem spicæ indicæ accedunt. Quæ est sententia Gesneri in "Hort. German," p. 265. (From Beckmann's "Lex Bot." p. 202.)

Tetter-berries (White briony berries), the berries were reputed remedial in the skin disease called *tettters*.

Tetterwort (Great Celandine, the plant Celidony, Halliwell).

THE END.

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